Feb. 21, 1967 F. R. BARBEE 3,305,100

ARTICLE HOLDER

Filed Jan. 15, 1965

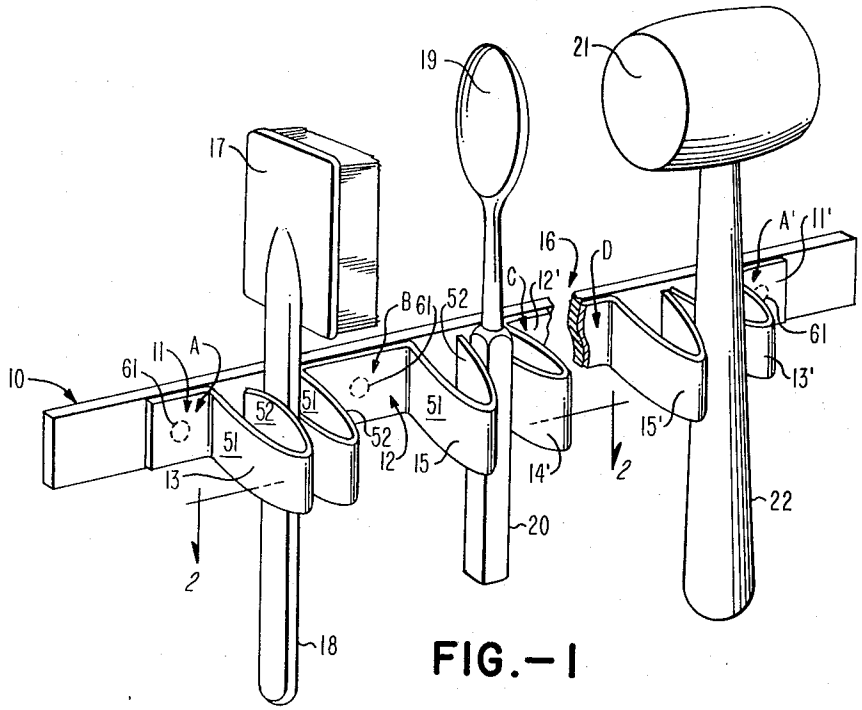


FIG.—1

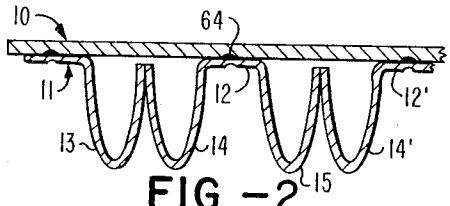


FIG.—2

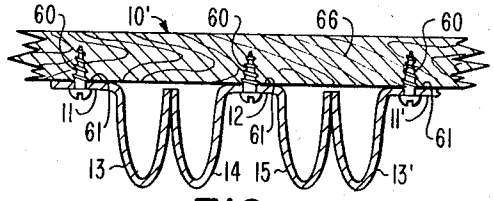


FIG.—3

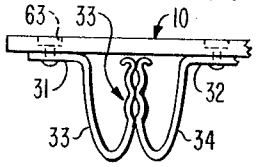


FIG.—5

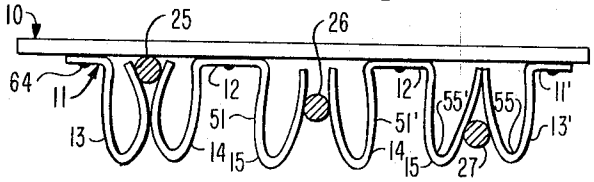


FIG.—4

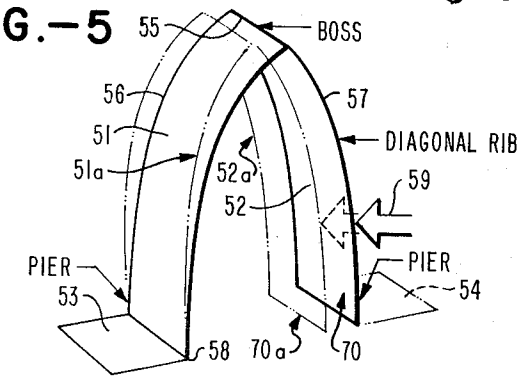


FIG.—6

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ARTICLE HOLDER

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8 Claims. (Cl. 211—60)

This invention relates to tool hanger devices and more particularly to means which may be assembled together to produce tool hanger strip assemblies of improving holding power and other qualities.

Any number of wall attachment means are provided in the prior art by which one may clamp-in the handles of tools, brooms and other household articles. Usually these articles are formed of a unitary element which is normally of a resilient material and the forming brings forward from the unitary element a pair of shaped resilient tynes which tend to spring together so that an article placed between the tynes is held in place under the resilient urge of the tynes. Such prior devices are frequently readily fatigued because the strains, placed on them in the insertion and removal of the articles to be held therein, tend to lessen their clamping strength and ultimately they fracture. Additionally, the prior art devices generally press upon the articles in their grasp at two points unless formed into complex tyne configurations for which fabrication of tools is both costly and difficult. Such tyne configurations tend to surround the article in a manner making it difficult to remove the article from their grip.

This invention contemplates a novel resilient tension clip means involving an end part and central parts with which strips of tool hangers may be made up to accommodate a great many tools. The end part is essentially half of a central part and no more material is required for thick handled articles than for thinner articles, the spacing of the juxtapositioned end and central parts on the assembly strip or bar being varied for the various thickness of article handles beyond certain limits which are imposed when individual end and central parts are placed contiguously on the assembly strip.

According to the invention an end unit consists of a generally L shaped element, the vertical arm of which has the general form of a thin Gothic cathedral arch and the flat portion is a continuation of, and normal to, one pier of the arch, the remaining pier of the arch being free. A central unit has a pier of end units in mirror image either end in the form of two such Gothic arch structures on opposite ends of a flat central portion. The pier of the Gothic arch not continuous with the flat portion is free to be compressed toward its pier mate. The action of pressing against the free pier, due to the diagonal vaulting rib portions of the arch causes the arch to move as a whole so that when a pair of free end piers are in contact with one another, and an article such as a tool handle is pressed between them, and moved from the boss of the arch to the base of the tool holder assembly bar on which they are mounted, the free pier ends execute a rocking motion, ending up by the free ends clamping the tool handle against the mounting bar. The points of the two arches, where each free pier end and its continuing diagonal join, are in contact to securely hold the tool handle in place.

Accordingly, it is an object of this invention to provide tool hanger clamping elements incorporating a central portion and an end portion which may be assembled in a plurality of such elements on a mounting bar.

It is a further object of this invention to provide tool hanger elements wherein one part includes a pair of such elements on a common base in mirror image relation and the other part is a single element of the mirror image pair.

It is another object of this invention to provide tool hanger clamping elements having a Gothic cathedral arch configuration wherein one half of the clamping element is a free pier of such an arch configured to apply a resilient urge against a juxtaposed mating free pier of a contiguous element.

It is a still further object of this invention to provide tool hanger clamping means the parts of which are arranged to have a novel resilient rocking action against one another whereby when a tool handle is inserted therein the free rocking ends form generally triangular resilient clamping mechanism with the mounting base upon which the means is assembled.

It is still another object of this invention to provide tool hanger strip assemblies comprising an array of dual Gothic arch-shaped resilient clamping elements mounted end to end, their resilient urges against one another providing secure and tight holding means for tools inserted therebetween.

These and other objects of the invention will become more clear from the specification thereof which follows wherein a representative group of embodiments thereof are shown in the figures and described. It is to be fully understood that the embodiments shown and described are not intended, or to be construed, as limiting the invention thereto, since those skilled in the arts appertaining thereto will be able to devise other embodiments, in the light of the teachings herein, within the ambit of the appended claims.

In the drawings:

FIGURE 1 is a partially broken perspective view of a representative assembly of tool clamping elements as made and used according to this invention assembled to a mounting bar;

FIGURE 2 is a cross sectional view through 2—2 of FIGURE 1 showing the assembly of elements thereof by spot welding a form of assembly thereof;

FIGURE 3 is a view similar to that of FIGURE 2 showing the assembly of articles of the invention to a wooden surface;

FIGURE 4 is a top plan view of the elements of the inventive assembly riveted to a mounting bar and showing in cross section the steps of insertion of a tool handle and the articulation of the elements of the invention in clamping of such handles;

FIGURE 5 is a detail of another configuration of the clamping portions of an assembly of the invention to show how various frictional surfaces may be supplied therein; and

FIGURE 6 is an explanatory illustration detailing the configuration elements of a Gothic arch as applied to the invention.

Referring now to FIGURE 1 wherein a mounting bar 10 is shown, the clamping elements of this invention attached to bar 10 may be seen to include end pieces such as 11–13, 11'–13' and central pieces such as 12–14–15.

Wherever in this description end elements such 11–13 or central elements as 12–14–15 are shown they are identified by the same reference characters or their primes such as 11'–13', etc.

The basic structural characteristics of the elements of the invention are shown in FIGURE 6. The Gothic arch configuration shown therein includes what may be described as a foot member 53 from which raises a pier 51 normal to foot 53. Curving inwardly from pier 51 and continuous therewith is a diagonal rib portion 56 terminating in a boss 55.

The pier 51 and rib 56 may be considered a single-leaf flat spring anchored at 58 and having a generally parabolic curve along its length. Such a spring structure will have a strength twice as great as a flat spring of the

same dimension anchored in the same manner and a resilience three times as great as the equivalent flat spring.

According to tables on page 454 of Mark's "Mechanical Engineers Handbook," fifth edition, published 1951 by McGraw-Hill of New York, where strength, a, of a flat spring for a given load equals $2S_s/3E$, the parabolic configuration of this invention yields a strength a, of $4S_s/3E$ where S_s is the safe stress due to bending in p.s.i., and E is Young modulus of elasticity in the tensional mode for the material used. In the present invention stainless steel is used preferably but other resilient spring materials may be used. In the same tables the value for deflection or resilience U of the flat spring is $.33S_s^2/6E$ whereas for a parabolic spring according to this invention the deflection U is $S_s^2/6E$.

From boss **55** an opposite diagonal rib **57** and a free pier **52** extend downward. In dashed line at **54** there is indicated the foot extension of pier **52** which is not present in the configuration used in this invention but would have been to complete the arch were the pier **52** and rib **57** not free. Pier **52** and rib **57** form a similar parabolic flat spring to pier **51** and rib **56**, the former being anchored at boss **55**. Thus it may be seen that the arch as used herein comprises a single foot member **53** supporting a pier **51** continuing through a diagonal rib **56** in a generally parabolic configuration to a boss or apex **55**. There follow from boss **55** an opposite diagonal rib **57** and pier **52** in an opposite parabolic configuration. Pier **52** is free to flex about boss **55** using boss **55** as a pivot. Pier **51** is captive on foot **53** and will pivot about the junction **58** of foot **53** and pier **51**. Thus any pressure applied as shown by arrow **59** against free pier **52** will both flex pier **52** on boss **55** and also apply pressure against boss **55** which will move pier **51** to flex about foot **53**. When the pressure of arrow **59** is applied closer to boss **55** more force is exerted on pier **51** and diagonal rib **56**. The displacement of piers **51** and **52** are indicated by the dashed line positions thereof shown at **51***a*, **52***a*.

In the assembly shown in FIGURE 1 three articles **17**, **19**, **21** may be seen inserted by their handles **18**, **20**, **22** respectively between arch elements **13**, **14**; **15**, **14'**; and **15'**, **13'** respectively. In FIGURE 4 three positions of the handle are shown at **25**, **26**, **27**. In FIGURE 4 a handle element at **27** is shown as it is being inserted between the free piers **52**, **52'** of the pair of arch elements **15** and **13'** causing bosses thereof **55** and **55'** to separate due to the pressure close to bosses **55** and **55'**. At this point piers **52**, **52'** remain in contact. As may be seen at **26** when the handle is pressed further between arches **14–15** towards mounting base **10**, free piers **52**, **52'** are forced apart. Continuing pressure goes beyond the point of balance between the resilient urge of free piers **52**, **52'** against bosses **55**, **55'** and the pressure against less restricted piers **51**, **51'** so that as free piers **52**, **52'** separate at their free ends bosses **55**, **55'** come closer together. This may be seen at **25** where the handle is now securely held in place by arch elements **13–14**. The ends of piers **52**, **52'** and the base **10** forms a tight triangular nest to hold the tool handle as shown at **25**.

As has been previously pointed out there are two basic elements forming part of an assembly of tool holding brackets according to the invention. One is the end piece **11–13** exemplified by A in FIGURE 1 and the other is a central piece **12–14–15** exemplified by B in FIGURE 1. Similar central pieces are shown in part at C and D to illustrate the fact that in an array of clamps according to the invention there may be many central elements or one central element such as B, C or D but two opposite end pieces A, A' must always complete an assembly. An assembly thus makes up at least a holder for two tools and consists of one element B and elements A, A'.

Elements such as A, B, C, D, or A' may be mounted to a wood or other wall **66** as indicated in FIGURE 3 by wood screws through perforations **61** provided for such mounting of the assembly. Arch elements A, A', B or C, D riveted to a metallic bracket such as **10** as may be seen in FIGURE 5. They may be spot welded as indicated at **64** in FIGURES 2 and 4.

In any case wall mounted tool and other accessory clamping means according to this invention comprise an end piece and a central piece. An end piece such as A, A' has a foot **53** forming a mounting for the end piece, a pier element **51** rising approximately at a right angle from foot **53** and being resiliently articulatable on the angle junction **58**, a diagonal rib **56** continuing from pier **51** in a gentle arched curve to an apex or boss **55**, an opposite diagonal rib **57** and free pier **52** extending from boss **55** in mirror image relation to rib **56** and pier **51**. Rib **57** and pier **52** are articulatable on boss **55** in a manner similar to the action at pier-foot junction **58**. The free end **70** of pier **52** is movable by pressure thereon as indicated by arrow **59** against both its own resilient urge and that due to the junction with boss **55** through the resilient urge of pier **51**. Because in normal use foot **53** is captive when the article is attached to a wall **66** or mounting bracket such as **10**, pier **52** moves more freely than pier **51** when pressure is applied.

A central piece such as B, C, D consists of two end pieces such as above described having a common foot. This is clearly seen in FIGURES 1 and 2, wherein arch elements **14** and **15** can be seen to be identical but mirror image elements having a common mounting foot **12**. When two end pieces **11–13** and **11'–13'** and one central piece **14–12–15** are mounted to a wall **66** or other structure as shown in FIGURE 3 a minimum assembly of the elements of the invention is accomplished. While not shown specifically it is clear that a single clamp would comprise an end element A and an element A' assembled in mirror image relation with free pier ends **52** being contiguous. A form of this is illustrated in FIGURE 5.

From the above discussion it should be clear that single and plural clamping assemblies may be made up from the end piece elements A, A' and the central elements B, C, D attached to wall structures directly as in FIGURE 3 or to assembly bars such as **10** shown in the other figures. It should also be clear as shown in FIGURE 5 at **33** that the free pier end of the arch structure such as A or A' or the other arch structures may be crimped, crenelated or corrugated, or otherwise formed with friction creating surfaces to add to the holding capacity thereof. In the latter embodiments (FIG. 5) the same configurations are possible as with the flat surface arch shown in the other figures.

What is claimed as new is:

1. Resilient clamping elements for receiving and holding articles with handles such as tools and the like, said elements comprising:

at least a mounting foot in combination with

at least a first parabolic flat spring member having ends, one end thereof being attached to said mounting foot, the parabola of said first flat spring member being bowed outwardly towards the opposite end of said mounting foot; and

at least a second parabolic flat spring member having ends, one end of said second flat spring member being joined with the other end of said first flat spring member, the remaining end of said second flat spring member being free, the parabola of said second flat spring member being bowed in a direction oppositely of the direction of the parabolic bowing of said first flat spring member, said resilient clamping elements being normally used in pairs in mirror image relationship wherein said free ends of the second parabolic flat spring members in each of said pair are in contact with one another and said mounting feet are directed oppositely of one another on a common plane, whereby when a tool handle is entered between said parabolic spring members in contact with one another they are separated and as the tool handle

is pushed further towards said mounting foot ends of said clamping elements against the resilient urge of said parabolic spring members the free ends of said second flat spring members separate further while the joined ends of said second flat spring members return to contact with one another to form about said tool handle a tightly gripping triangle to hold said handle securely in said resilient clamping elements.

2. Resilient clamping elements as defined in claim 1, wherein

said mounting foot is elongated and there is a combination of said first and said second parabolic flat spring members at each end of said elongated mounting foot.

3. A tool holding and receiving device comprising:

a mounting support means; and

a pair of resilient clamping elements each of said clamping elements including at least a mounting foot in combination with at least a first parabolic flat spring member having one end thereof attached to said mounting foot and a second parabolic flat spring member being joined with the other end of said first flat spring member, the remaining end of said second flat spring member being free and the parabolae of said respective flat spring members bowing oppositely of one another, each of said pair of resilient clamping elements being positioned on said mounting support means in mirror image relation to the other of said pair, and the respective free ends of said second parabolic flat spring members thereof are in contiguous juxtaposition with one another;

whereby when one presses the handle of a tool or similar article between said juxtaposed members they separate, by the pressure of said handle against the resilient urge of said parabolic spring members articulating on the respective mounting foot elements to which each of said first parabolic flat spring members is attached, said free ends remaining separated as said handle is pressed further between said juxtaposed members, said junctions of said first and second parabolic members returing to said contiguous juxtaposition to form with said mounting support means a triangular grip upon said tool handle or similar article.

4. An assembly of resilient clamping members for receiving and holding a plurality of articles with handles such as tools and the like, said assembly comprising:

a mounting means;

a first clamping element, including at least a mounting foot in combination with at least a first parabolic flat spring member having one end thereof attached to said mounting foot and a second parabolic flat spring member being joined with the other end of said first flat spring member, the other end of said second flat spring member being free and the parabolae of said respective flat spring members being bowed in opposite directions;

at least a second clamping element including an elongated mounting foot having attached at each end thereof one of said parabolic first and second flat spring members in mirror image relation to one another; and

a third clamping element, identical to but in mirror image of said first clamping element;

said three clamping elements being positioned on said mounting means wherein said first and third clamping elements are located on either end of said second clamping element, the respective free ends of said second flat parabolic spring members of said first and third members being in juxtaposition with and contiguous with the respective free ends of said second flat parabolic spring members of said second clamping element, said tool handles or the like being

receivable and holdable between said juxtaposed free ends when pressed therebetween.

5. A resilient clamping element formed from a continuous strip of flat spring stock in the shape of a Gothic cathedral arch wherein one pier and diagonal rib of said arch are attached at the pier end thereof approximately perpendicular to a mounting foot, and the opposite pier and diagonal rib are joined by the respective rib ends thereof to said one pier and rib forming a boss, and said pier end of said opposite pier and rib being free to flex on said boss while said one pier and rib being flexible on said mounting foot.

6. A resilient clamping element formed from a continuous strip of flat spring stock comprising an elongated mounting foot at either end of which is formed a Gothic cathedral arch, each of said arches being a mirror image of the other, and each of said arches being attached by one pier and diagonal ribs thereof to said elongated mounting foot and flexible thereon, the other pier and diagonal ribs thereof being free and flexible on the bosses thereof.

7. An assembly of resilient elements for receiving and holding articles with handles such as tools and the like, said assembly comprising:

a mounting support; and

at least a first and a second end piece mounted on said support in mirror image relationship to one another;

each of said end pieces being formed from a continuous strip of resilient material and each having a single flat foot member, a first pier substantially at a right angle with said foot, a diagonal rib being a continuation of said first pier, a second diagonal rib and pier in mirror image relation to said first rib and pier, said first and second ribs being joined at an apex said second pier having a free end, said piers and ribs forming a Gothic cathedral arch structure with said apex being the boss thereof, said first pier being captive and attached to said foot and said second and free pier being flexible upon pressure thereupon so that when said two end pieces are assembled together said free piers are contiguous, being separable by the pressure of the handle of a tool inserted therein against the resilient urge of said free ends and said apical boss, coming together again after said tool handle has been forced beyond the center of said free pier towards the mounting end thereof to hold said handle of said tool or other article against said mounting support.

8. An assembly of resilient elements for receiving and holding articles with handles such as tools and the like, said assembly comprising:

a mounting support;

a first and a second end piece mounted on either end of said support in mirror image relationship to one another; and

a plurality of central pieces mounted end to end on said support between said end pieces;

each of said end pieces being formed from a continuous strip of resilient material and each having a single flat foot member, a first pier substantially at a right angle with said foot, a diagonal rib being a continuation of said first pier, a second diagonal rib and pier in mirror image relation to said first rib and pier, said first and second ribs joined at an apex, said second pier having a free end, said piers and ribs forming a Gothic cathedral arch structure with said first pier being captive attached to said foot said second and free pier being flexible upon pressure thereupon, each of said central pieces being formed from a continuous strip of resilient material and each having an elongated flat foot member at either end of which is formed a Gothic arch, each of said Gothic arches being in mirror image relation to the other and each of said central piece Gothic arches being attached by a respective pier to said elongated flat foot member and flexible thereon, and each of the

other pieces of said central piece Gothic arches being free and flexible on the bosses thereof, so that when said two end pieces and said central pieces are assembled together on said mounting support said free piers of each are contiguous and juxtaposed to the free piers of others and are separable by the pressure of the handle of a tool inserted therein against the resilient urge of said free ends and said apical boss as thereof, coming together again after said tool handle has been forced beyond the center of said free pier towards the mounting end thereof to hold said handle of said tool or other article against said mounting support.

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