June 5, 1945. A. H. HABERSTUMP 2,377,416

BUCKING BAR AND SUPPORT

Filed Jan. 4, 1943

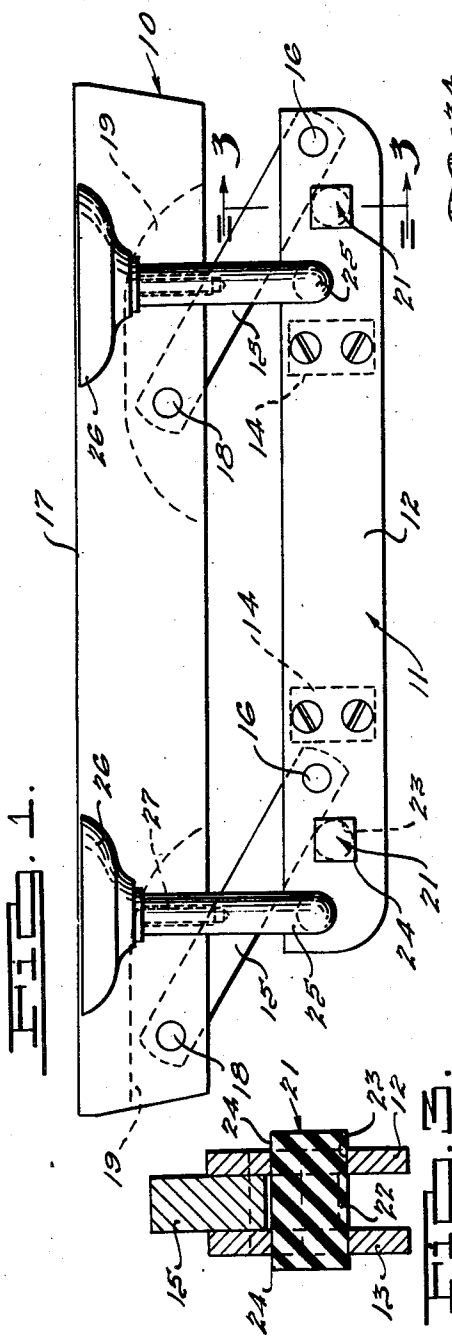


Fig. 1.

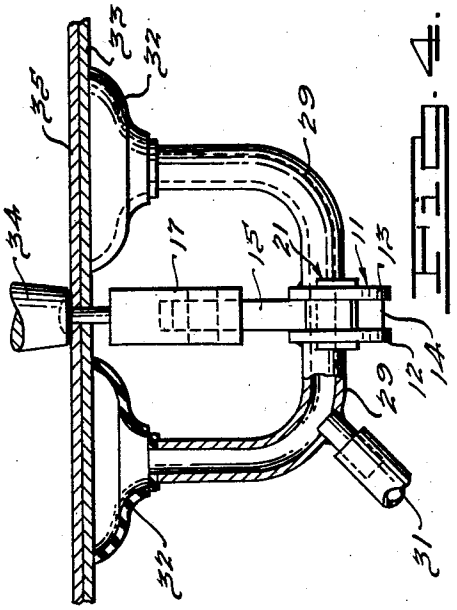


Fig. 4.

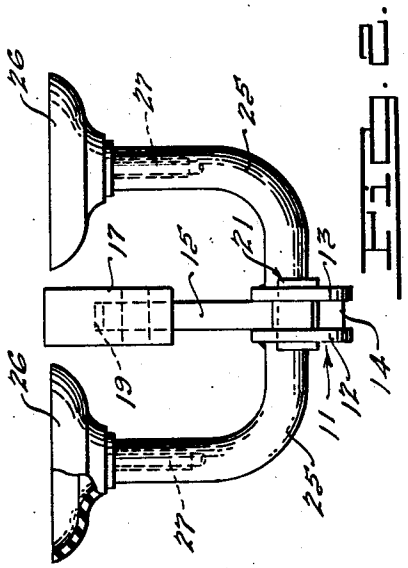


Fig. 2.

Fig. 3.

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BUCKING BAR AND SUPPORT

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6 Claims. (Cl. 78—53.5)

This invention relates to bucking bars, and particularly to new and novel means for supporting and applying resilient pressure to a bucking bar which spans a plurality of rivets which are to be swaged seriatim.

In the copending application of Alfred H. Haberstump, Serial No. 413,764, filed October 6, 1941, and assigned to the assignee of the present invention, bucking bars of various types are illustrated, described and claimed. These bucking bars may be attached to elements to be riveted together by clamping means, or are supported on standards on which the pieces to be riveted together are secured. Where the particular workpieces to be riveted do not lend themselves for supporting the bucking bar on the clamps therewith, or where standards cannot be employed for supporting both the bucking bar and the workpieces, the present invention, embodying a unique support for the bar, has application.

The bucking bar proper is mounted on a pair of links which are pivoted to a base member, all of which are in parallelogram relation to each other. Rubber elements extend through the base member in position to be engaged by the links to provide a resilient pressure thereto. Arms extend from both sides of the base member and are projected upwardly for supporting vacuum cups in position to engage the under side of a sheet to be riveted. By forcing the cups against the surface of the sheet, a holding force is produced which retains the bar against the sheet with a predetermined resilient pressure. A plurality of rivets which are to be swaged are insertable in apertures which are aligned with the bar. A downward pressure is applied to a percussion hammer to force the rivet head into engagement with the sheet and to deflect the bucking bar against the rubber elements supported by the base member. When the hammer is operated, the reaction of the bucking bar swages the rivet end and forms a bucktail of desired height and diameter when a predetermined number of strokes of the hammer have been applied. A timing device, such as that illustrated and described in the copending application of Alfred H. Haberstump, Serial No. 439,115, filed April 15, 1942, and assigned to the assignee of the present invention, may be employed for accurately timing the number of strokes for each cycle of operation.

It is within the purview of the invention to apply a vacuum line to the suction cups to produce a greater vacuum and holding force when only small cups can be employed, which would not provide sufficient holding force for the bar.

Accordingly, the main objects of the invention are: to support a bucking bar on the arms of a base member having vacuum cups on the end which engage the sheet to be riveted; to project arms on a base member of a bucking bar upwardly on which vacuum cups are supported below the top of the bar to form a support therefor with the bar in engagement with the under surface of the element to be riveted; to construct a bucking bar from a base member formed of spaced elements between which links are pivoted and disposed to rest upon rubber elements extending through the elements for applying a resilient pressure to a bucking element which is pivoted on the ends of the links; to support a bucking bar on hollow arms which have vacuum cups on the ends thereof connected to a source of vacuum for providing a support for the bar on the elements to be riveted; and, in general, to form a bucking bar and a support therefor which is simple in construction, positive in operation, and economical of manufacture.

Other objects and features of novelty of this invention will either be specifically pointed out or will become apparent when referring, for a better understanding of the invention, to the following description, taken in conjunction with the accompanying drawing, wherein:

Figure 1 is a view in elevation of a bucking bar and a support therefor embodying features of this invention;

Fig. 2 is an end view of the structure illustrated in Fig. 1;

Fig. 3 is an enlarged sectional view of the structure illustrated in Fig. 1, taken on the line 3—3 thereof; and

Fig. 4 is an enlarged view, partly in section, of structure, similar to that illustrated in Fig. 2, showing a modified form thereof.

The bucking bar 10 embodies a base element 11 made of side members 12 and 13 which are mounted in spaced relation by a pair of blocks 14. Between the elements 12 and 13, links 15 are mounted on pivots 16. The opposite ends of the links are secured to the bucking element 17 by pivots 18.

Recesses 19 are provided in the under side of the bucking element for receiving the ends of the links 15. Rubber elements 21, having round body portions 22, extend through annular apertures 23 in the side members 12 and 13 in position to engage the links 15 when the bucking element 17 is in raised position. Square ends 24 on the rubber elements 22 extend over the outside of the side members 12 and 13 for retaining the rubber ele-

ments in position. Outwardly extending, upwardly projecting arms 25 are provided on each side of the members 12 and 13 near each end thereof for supporting vacuum cups 26 which are secured to the end of the elements 25 by screws 27.

It will be noted, from Figs. 1 and 2, that the bucking element 17 projects above the cups 26 when the links 15 rest upon the rubber elements 21 so as to have the bucking element deflected against the rubber elements when the vacuum cups 26 are secured against the under side of a sheet of metal to be riveted. This provides a predetermined resilient pressure to the bucking element which will be sufficient to produce a reaction on the ends of the rivets when they are struck by the percussion hammer to produce the swaging operation. This eliminates the hazard of having too great a pressure applied to the bucking element 17, which would react upon the cups 26 to weaken the holding force thereof and release the bar from the sheet.

The parallelogram arrangement of the bucking element 17 with the base element 10 and the pair of parallel links 15 produces a transverse support for the bucking element which will have all points throughout the length of the bar react in the same manner on a rivet. Like bucktails will be swaged on the rivet ends upon the application of a predetermined number of blows of the percussion hammer on each of the rivets. This eliminates the examination and the restriking of the rivets which occurs when an individual manually supports a bucking bar against the rivet ends.

In Fig. 4 a slightly modified form of bucking bar is illustrated, that wherein the outwardly and upwardly projecting elements 29 are hollow tubes to which a conductor 31 is joined for supplying a vacuum suction to cups 32 secured to the end of the elements 29. This may be employed when small cups must be employed which would not have sufficient strength to support the bar by a vacuum caused by the deflection of the cup against the sheet of material 33. The application of a rivet to the bar is illustrated, with the bar deflected by the rivet when the percussion hammer 34 is forced downwardly against the rivet head to move the head against the top surface of the sheet 35. The deflection of the bar adds additional resilient pressure thereto which retains the bar against the rivet end as the end is swaged by the operation of the percussion hammer on the rivet head to form the bucktail on the rivet end. The bucking bars illustrated in the figures are rugged in construction and positively retained in position to engage the rivets to be swaged. It is to be understood that the bar may be of any shape conforming to the straight or curved line in which the rivets are disposed and has the top face positioned so as to be normal to the axis of the rivets to produce bucktails having their axes aligned with the axes of the rivets.

What is claimed is:

1. A bucking bar, including, in combination, a base element, a pair of links supported on the base element, a bucking element supported on the ends of the links, supporting means on the base element by which the base element is supported with the bucking element in position to engage a plurality of rivets to be swaged, and vacuum cups attached to the supporting means for securing the supporting means in position.

2. A bucking bar, including, in combination, a base element, a pair of links pivoted on said base element, a bucking element pivoted on said links, resilient means supported by said base element in engagement with said links for urging said links to move the bucking element toward the rivet to be swaged, arms on said base element, and vacuum cups on said arms for supporting said bucking bar in position to engage the ends of a plurality of rivets to be swaged.

3. A bucking bar, including, in combination, a pair of spaced elements, links pivoted between said elements, resilient means supported by said elements with which the links engage for urging said links to move the bucking element toward the rivets to be swaged, upwardly projecting arms secured to said spaced elements, vacuum cups supported on the ends of said arms, and a bucking element pivotally supported on the ends of said links.

4. In a bucking bar, a base element embodying a pair of members secured in spaced-apart relation, a pair of links pivoted between said members, rubber elements projecting across said members in position to engage said links, a bucking bar pivoted to the ends of said links, upwardly projecting arms on said base member, and vacuum cups supported on the ends of said arms.

5. A bucking bar, including, in combination, a base element, links pivoted on said base element, a bucking element pivoted to the ends of said links, tubular elements projecting upwardly from the base element, vacuum cups supported on the ends of the tubular elements, and a conduit joined to said tubular elements.

6. In a bucking bar, an elongated base element, a bucking element of a length to engage a plurality of rivets mounted for movement toward and from said base element, means for applying a resilient pressure between said base element and said bucking element, and vacuum means for supporting the base element with the bucking element in position to engage the ends of a plurality of rivets to be swaged.

ALFRED H. HABERSTUMP.