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Zeltwanger et al.

[11] **3,744,572**

[45] **July 10, 1973**

[54] **CHISEL PLOW SPRING CUSHION CLAMP**

[75] Inventors: **Earl D. Zeltwanger,** Mishawaka; **LaRon O. Quickstad; Roger D. Laidig,** both of South Bend, all of Ind.

[73] Assignee: **White Farm Equipment Company,** Cleveland, Ohio

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[21] Appl. No.: **191,748**

[52] **U.S. Cl.** **172/710,** 16/187, 16/188

[51] **Int. Cl.** **A01b 15/00**

[58] **Field of Search** 172/710

[56] **References Cited**

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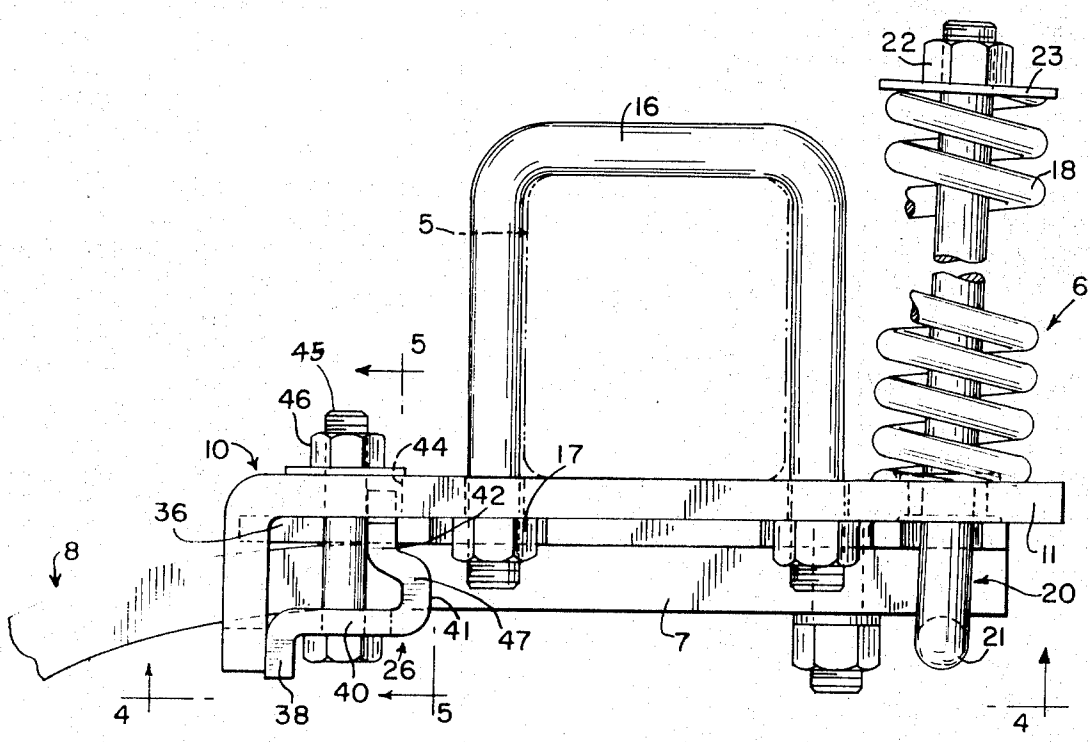
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Primary Examiner—Robert E. Pulfrey
Assistant Examiner—R. T. Rader
Attorney—Fred S. Lockwood et al.

[57] **ABSTRACT**

A spring cushion clamp for mounting a tool shank onto the tool support bar of a ground working implement, e.g., a chisel plow. In addition to a main bracket having a depending flange at the rear and spring cushion means at the front, including an upwardly biased U-member or U-bolt for engaging under the front end of a tool shank, the clamp comprises a keeper plate that fits underneath the horizontal portion of the bracket with a rearwardly projecting tongue extending through an opening in the corner of the bracket and a special corner clamping member secured in the inside of the corner of the main bracket. The clamping member is bifurcated to provide an opening therein through which the tool shank and keeper plate tongue extend. Shoulders on the keeper plate at the root of the tongue engage and pivot against the legs of the bifurcated portion of the clamping member. The bottom edge of the opening between the legs of the corner clamping member serves as a stop which the tool shank engages during tilting.

8 Claims, 7 Drawing Figures



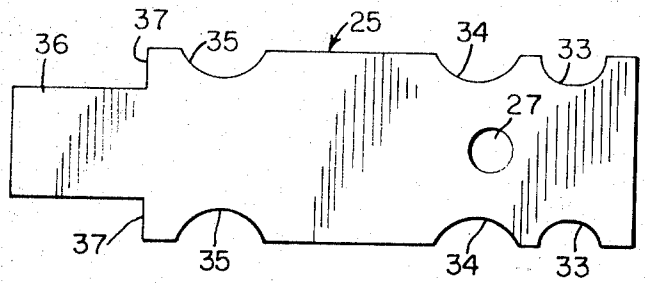


FIG. 6

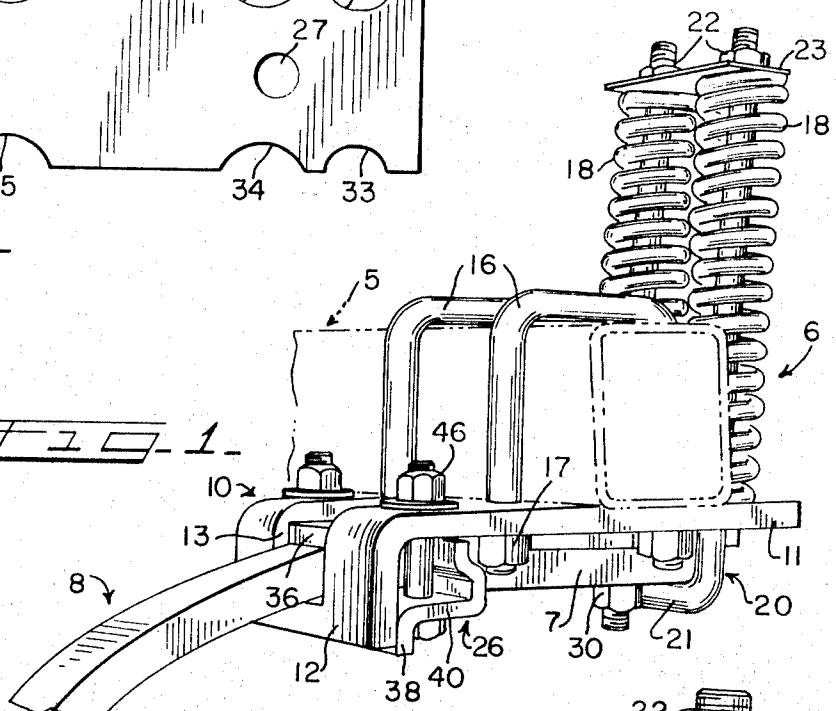


FIG. 1

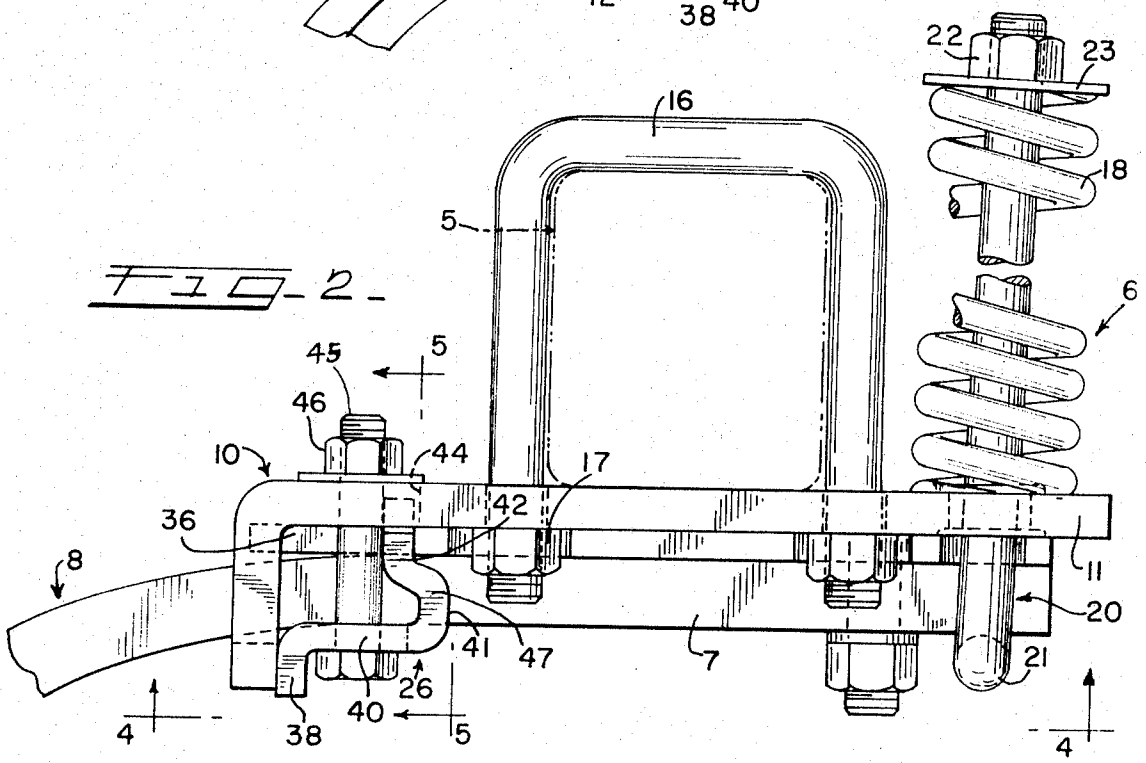


FIG. 2

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FIG. 3

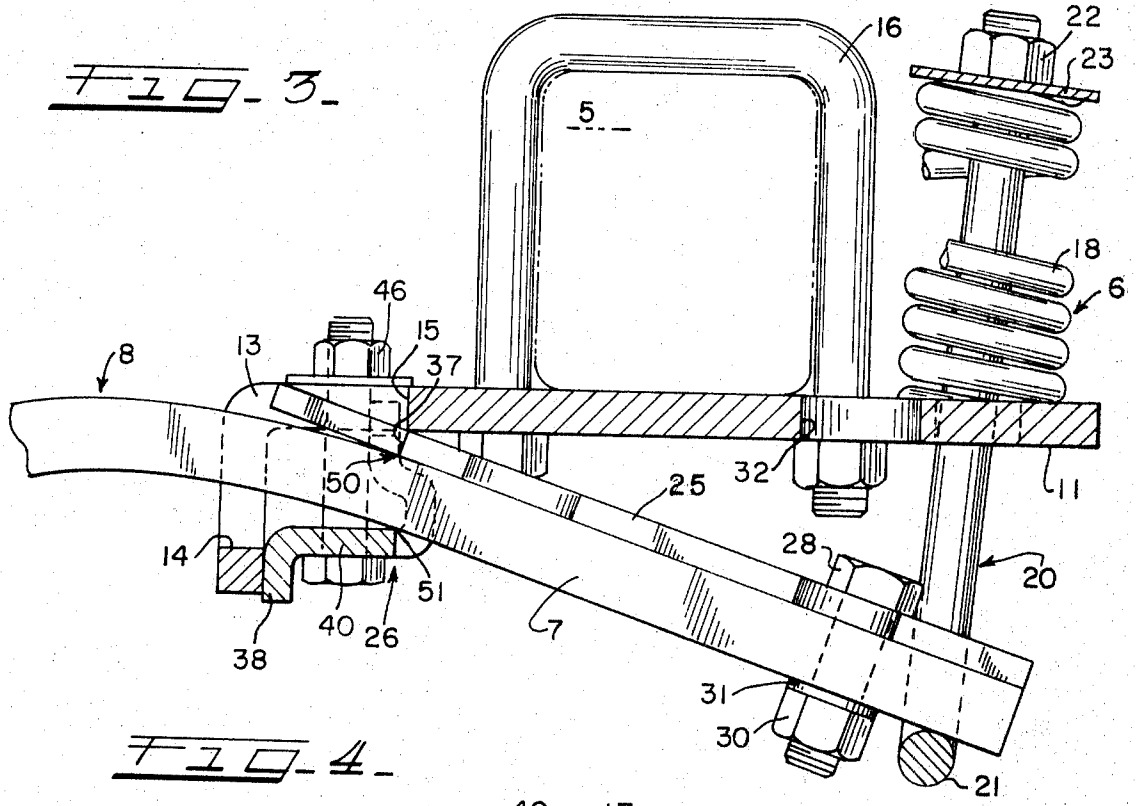


FIG. 4

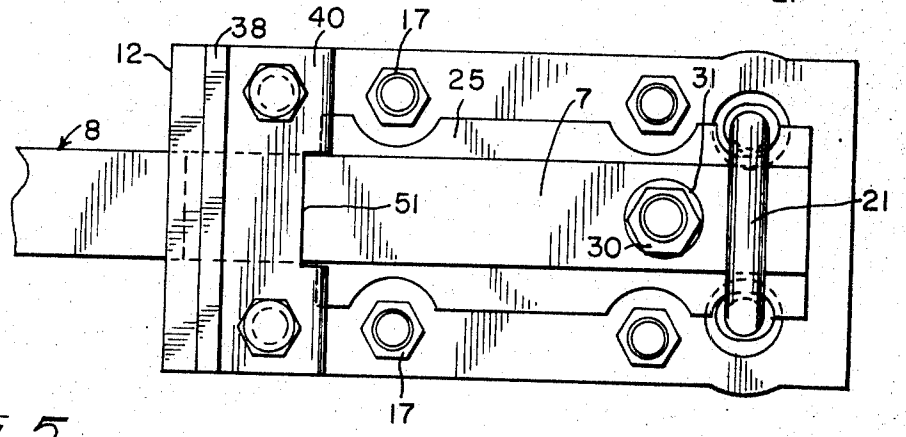
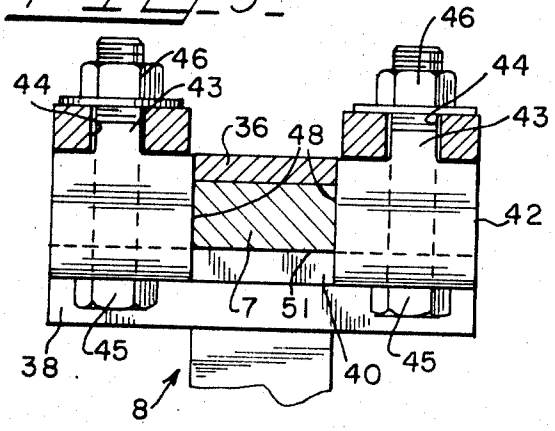


FIG. 5



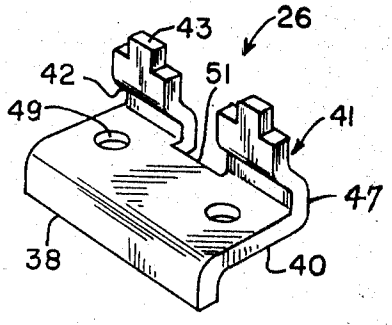


FIG. 7

CHISEL PLOW SPRING CUSHION CLAMP

This invention relates generally to innovations and improvements in spring cushion clamps for mounting tool shanks on the tool support bar of a ground working implement such as a chisel plow or the like. By virtue of the innovations and improvements, the various parts of the clamp may be formed or stamped from steel on a quantity production basis at low cost. In addition, there are no parts which are subject to appreciable wear. Spring cushion clamps embodying the invention function in an improved manner since the shanks of tools are held firmly in a vertical position so that weeds may be cut out and not missed. Furthermore, there is no requirement for expense-adding close-manufacturing tolerances with line-to-line fit in order to achieve and have the shank held in the vertical position.

In general, the present invention relates to innovations and improvements in spring cushion clamps of the general type disclosed in U.S. Pats. such as No. 2,869,657 to Harrop, No. 3,031,019 to Gysler and No. 3,470,966 to Padwick.

The object of the invention, generally stated, is the provision of spring cushion clamps of the class described embodying and exhibiting the above-mentioned innovations, improvements and advantages over the prior art.

Certain other objects of the invention will in part be obvious, and will in part appear hereinafter.

For a more complete understanding of the nature and scope of the present invention, reference may now be had to the following detailed description thereof taken in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view taken from the rear and side of a spring cushion clamp forming one embodiment of the invention;

FIG. 2 is a side view of the spring cushion clamp shown in FIG. 1;

FIG. 3 is a dise elevational view corresponding to FIG. 2 with the tool shank in tilted position and with certain parts shown in vertical section;

FIG. 4 is a bottom plan view taken on line 4—4 of FIG. 2;

FIG. 5 is a vertical sectional view taken on line 5—5 of FIG. 2;

FIG. 6 is a plan view of a keeper plate forming one element of the embodiment; and,

FIG. 7 is a perspective view of a corner clamping member forming another element of the embodiment.

Referring initially to FIG. 1, a horizontal tool support bar is indicated in broken line at 5 and typically may be supported by a conventional three-point hitch on the rear of a farm tractor. A spring cushion clamp is indicated generally at 6 as secured in a fixed position on the tool bar 5. It will be understood that the implement will ordinarily have a plurality of spring cushion clamps 6 secured at desired intervals on the tool bar 5 for row-crop cultivation or other ground working operations. The function of each spring cushion clamp 6 is to mount the shank portion 7 of a ground engaging tool, indicated generally at 8, such as a chisel plow tool, cultivator tooth, etc., in such manner that this tool element can tilt and yield so as to rise over obstacles without breakage and then reset or resume normal working position after each obstacle is passed.

The spring cushion clamp 6 comprises a bracket indicated generally at 10 having a main horizontal portion 11 and a downwardly depending flange or leg 12 at the rear. A generally rectangular corner window 13 is formed in the corner of the bracket 10 with the bottom edge of the window being indicated at 14 (FIG. 3) and the upper edge indicated at 15. The width of the window 13 is such as to accept the square or rectangular shank 7, preferably without unnecessary clearance.

The bracket 10 is firmly secured to the underside of the tool bar 5 by means of a pair of inverted U-bolts 16—16 the threaded lower ends of which project downwardly through registering apertures provided therefor in the horizontal bracket portion 11. The U-bolts are drawn down by means of hex nuts 17—17.

The cushion action of the clamp 6 is provided by means of a pair of upstanding helical springs 18—18 through which extend the upstanding legs of an elongated U-bolt 20. The bight 21 of the U-bolt 20 is located underneath the bracket portion 11 and bears upwardly against the underside of the front end of the shank 7. The legs of the U-bolt 20 are threaded on their upper ends and the springs 18 are maintained under the desired degree of compression by tightening nuts 22—22 down on the upper side of a cross plate 23 which bears against the upper ends of the springs 18.

There are two additional parts to the clamp 6 that combine and cooperate with the parts that have already been descraibed. One of these is a keeper plate 25 (FIG. 6) and the other is a corner clamping member indicated generally at 26 (FIG. 7). The keeper plate 25 is generally rectangular in outline and is adapted to sandwich or fit in between the underside of the bracket portion 11 and the top of the tool shank portion 7. The keeper plate 25 is provided with an aperture 27 toward the front end for receiving the shank of a headed bolt 28 (FIG. 3) which also passes through a registering aperture in the tool shank 7 and carries a hex nut 30 and lock washer 31. This arrangement secures the forward end of the keeper plate 25 on the forward portion of the tool shank 7. The horizontal bracket portion 11 is provided with an aperture 32 (FIG. 3) for receiving the head of the bolt 28 so that the keeper plate 25 can in normal position lie flat upwardly against the bracket 11.

The opposite side edges of the keeper plate 25 are provided with three sets of registering or aligned semicircular formations 33—33, 34—34, and 35—35 (FIG. 6). The foreward formations 33—33 receive the inner portions of the legs of the U-bolt 20 thereby assisting in retaining the proper engaging relationship between the U-bolt 20, keeper plate 25 and the tool shank 7. The formations 34—34 receive the inner portions of the front pair of hex nuts 17 for the U-bolts 16 while the formation 35—35 receive the inner portions of the rear pair of hex nuts 17 for the U-bolts 16, when the keeper plate 25 is flatwise engaging the underside of the bracket portion 11.

The keeper plate 25 has an integrally formed tongue 36 at the rear which projects without unnecessary clearance through the corner opening 13 in the bracket 10. Formation of the tongue 36 serves to provide the keeper plate 25 adjacent its rear end, with a pair of aligned shoulders 37—37 which, as shown in FIG. 3, having pivoting engagement with certain portions of the corner clamping member 26 as will be described.

The corner clamping member **26** (FIG. 7) is integrally formed with a plurality of formations. Commencing at the bottom portion and progressing upwardly, the member **26** has a bottom flange or leg portion **38** which engages the bottom end of the bracket flange **12** on the inside thereof. This engagement provides increased beam strength and imparts increased stiffening. Extending forwardly from the bottom flange portion **38** is a generally horizontal portion **40.** A bifurcated portion **41** extends upwardly from the forward end of the horizontal portion **40** so as to provide separate or spaced upwardly extending legs **42—42** which at the upper ends terminate in tab extensions **43—43.** The tab-like extensions **43** project into the forward portions of forwardly extended bolt-receiving openings **44—44** (FIG. 2) provided in the rear portion of the bracket horizontal portion **11** on each side of the corner opening **13** for accomodating a pair of bolts **45—45.** The bolts **45** also project through registering apertures **49—49** provided therefor in the horizontal portion **40** of the clamping member **26.**

In order to provide an enhanced clamping action for the member **26** each of the upstanding legs **42** of the bifurcated portion **41** is provided adjacent its lower end with a forwardly extending bulge portion **47.**

In assembling the corner clamping member **26** with the associated parts, the lock nuts **46** on the bolts **45** are tightened so that the shank portion **7** is snugly and securely held between the tongue portion **36** and the horizontal portion **40** of the clamping member **26.** Normal pulling action of the tool **8** serves to force the shanks of bolts **45** against the rear ends of openings **44** and to force the shoulders **37** against the legs **42** as shown in FIG. **2.**

It will be seen from FIG. **5** that the spacing between the opposing inner vertical edges **48—48** of the upstanding legs or branches **42** of the clamp **26** are such that the tongue portion **36** and the shank portion **7** pass between these edges with only sufficient clearance to permit free tilting action. By virtue of this relationship together with having the shank **7** firmly clamped between the horizontal portion **40** and keeper plate **25,** the shank **7** is firmly held against axial twisting or rotation. Accordingly, the entire shank is maintained in a vertical position and the ground engaging portion of the tool on the shank **8** is normally forced to pass straight through and cut out weeds.

In operation the springs **18** are tightened sufficiently to normally hold the parts in the relationship shown in FIGS. **1** and **2** with the horizontal bracket portion **11,** keeper plate **25** and shank **7** forming a closed sandwich. The rearward drag on the tool **8** is absorbed by engagement between the edges or shoulders **37** on the keeper plate **25** and the front faces of the legs **42** of the corner clamping member **26.** The rear faces of the legs **42** are in turn forced against the front sides of the shanks of bolts **45** and the rear sides of the shanks are forced against the rear ends of openings **44.** When the tooth (not shown) on the rear end of the shank **7** engages an obstacle offering sufficient resistance, the shank **7** will tilt against the force of the springs **18** as illustrated in FIG. **3.** In tilting the bottom corners of the edges **37** on the keeper plate **25** pivot against the front of the legs **42** along horizontal contact lines as indicated at **50** in FIG. **3.** This tilting action can continue until the underside of the shank **7** engages the corner clamping member **26** along the edge **51** as shown in FIG. **3.**

In the event that after a period of use any shank play develops it can be readily eliminated by tightening the nuts **46.**

What is claimed is:

1. In combination in a spring cushion clamp for mounting a tool shank having a front end on a tool support of a ground working implement with said clamp including a bracket having a horizontal portion with front and rear ends and a depending flange on the rear end with an opening in the corner of said bracket formed by the juncture of said horizontal portion and said depending flange, attaching means for securing said horizontal portion in fixed position under said support, and spring cushion means mounted on the front end of said horizontal portion having an upwardly biased U-member with a bight portion thereof extending transversely underneath said front end for biasing engagement under the front end of said tool shank mounted in said spring cushion clamp, the improvement comprising: a keeper plate with a rear end and adapted to extend underneath and bear against the underside of said bracket horizontal portion, said keeper plate having a tongue at its rear end which projects through said corner opening for tilting therein and having transversely aligned shoulders at the proximal end of said tongue; a corner clamping member secured within the corner of said bracket and having a lower end portion engaging said depending flange on said bracket, a generally horizontal portion with a front end extending forwardly from said lower end portion, and a generally upwardly extending bifurcated portion having legs extending upwardly from the front end of said generally horizontal portion with the legs thereof having supporting engagement adjacent their upper extremities; and means for tightening said corner clamping member whereby it is secured in position and said generally horizontal portion thereof presses on the underside of said tool shank; said transversely aligned shoulders of said keeper plate bearing against the front surfaces of said legs of said bifurcated portion for absorbing rearward drag on said tool shank and said shoulders pivoting against said legs when said tool shank tilts on encountering an obstacle.

2. The improvement of claim **1** wherein a fastener is provided for securing said keeper plate adjacent the front end thereof to said tool shank.

3. The improvement of claim **1** wherein said keeper plate has in its opposite sides formations adjacent the front end thereof for engagement with the inner portions of the legs of said U-member for retention of said keeper plate against forward movement relative to said bracket.

4. The improvement of claim **1** wherein said legs of said bifurcated portion of said corner clamping member have forwardly extending bulges therein.

5. The improvement of claim **1** wherein said means for tightening said corner clamping member comprise a pair of bolts extending vertically through pairs registering apertures in said generally horizontal portion of said corner clamping member and said bracket horizontal portion.

6. The improvement of claim **5** wherein said upper extremities of said legs of said bifurcated portion have supporting engagement against the front sides of said pair of vertically extending bolts.

7. The improvement of claim 5 wherein said apertures in said bracket horizontal portion through which the upper ends of said pair of vertically extending bolts pass are enlarged forwardly and receive therein said upper extremities of said legs of said bifurcated portion.

8. The improvement of claim 1 wherein said transversely aligned keeper plate shoulders have aligned straight line bottom edges which fulcrum against said legs of said bifurcated portion during tilting of said tool shank.

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