May 23, 1967 C. G. VIDRINE 3,320,875

AGRICULTURAL APPARATUS

Filed March 15, 1965

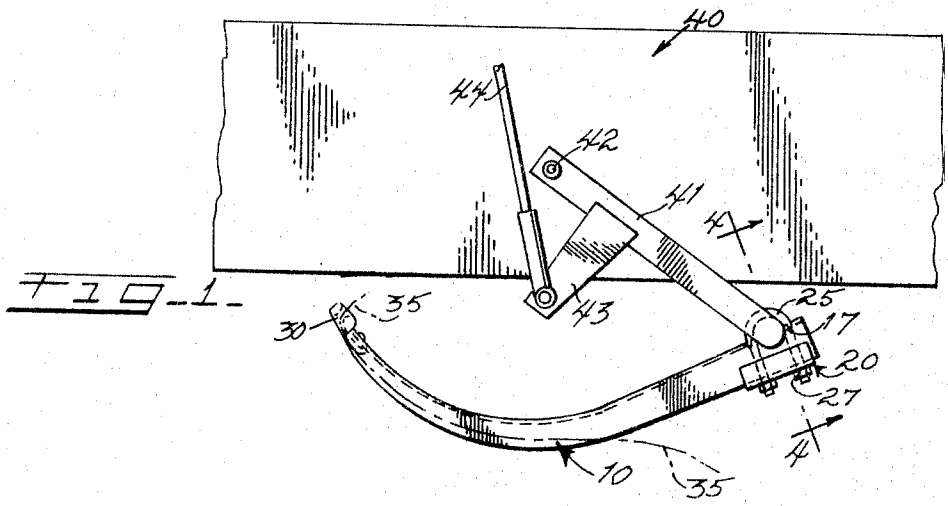


FIG. 1

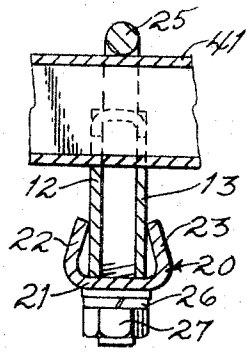


FIG. 4

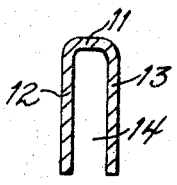


FIG. 5

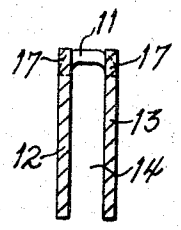
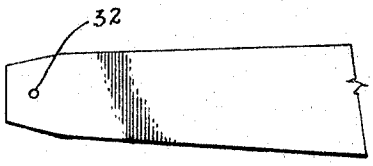


FIG. 6



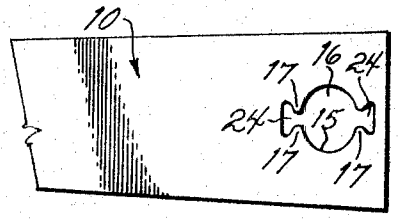


FIG. 2

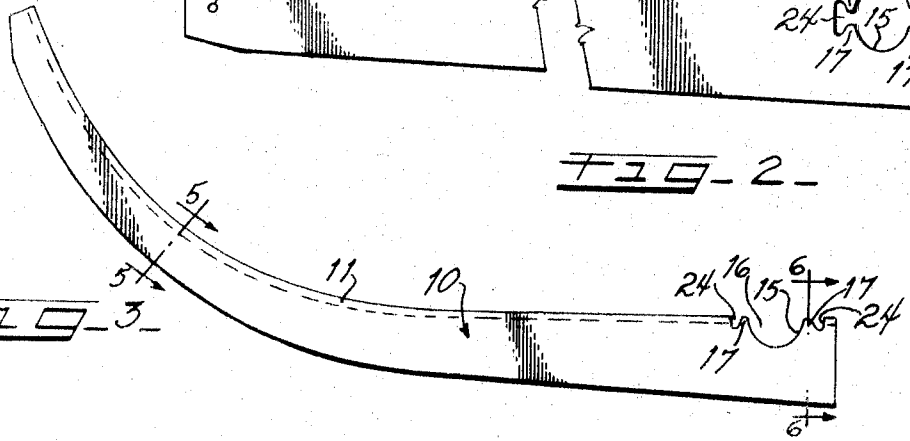


FIG. 3

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This invention pertains to a needle for a hay baler, in particular, to a means for mounting a sheet metal needle on the baler tie pipe. The mounting means comprises a cutout in the spine area of the needle for seating the needle on the tie pipe, a U-bolt secured to the tie pipe and extending through the needle, and a needle cap fitted over the top and sides of the needle to provide a bearing surface for the U-bolt nuts and to prevent buckling of the sides of the needle.

Although sheet metal baler needles are generally not as rigid as the conventional cast iron baler needles, the sheet metal needle still has many advantages. Sheet metal is, for one thing, cheaper than cast iron. Also, a sheet metal needle is lighter than a cast iron needle, so that less power is needed to drive it and smaller inertia forces and shock result from the high speed of needle travel and the abrupt starting and stopping of the needle at the dead-center points of its strokes. Sheet metal needle construction permits, in addition, a deep twine groove, which holds the twine in the correct feeding path and shields it from damage by baler components adjoining the needle and from incoming hay, which can force the twine away from the needle and expose it to damage. The twine groove of the sheet metal needle is, moreover, inherently smooth as compared with the rough, jagged twine groove of the cast iron needle and is, therefore, less apt to damage the binding material. Lastly, a sheet metal needle can be fabricated within close tolerances; whereas a cast iron needle is relatively difficult to cast accurately.

On the other hand, prior art methods for attaching a sheet metal needle to the baler tie pipe have not been altogether satisfactory. One method of attaching sheet metal needles to the tie pipe has been to punch round holes in the sides of the needle for insertion of the tie pipe and to weld the needle to the tie pipe at these holes (see FIG. 7 of U.S. Patent No. 2,733,652). Some bad features of this method are that welding is required on both sides of the needle, misalignment of the needle is not easily corrected because the attachment is permanent, and replacement of a damaged needle is also difficult because of the permanent attachment.

Objects

To overcome the above problems, it is one object of this invention to provide a sheet metal baler needle that can be easily and accurately assembled onto the baler tie pipe. Another object is to provide for a sheet metal baler needle a precision mounting that is simple and inexpensive. Still another object is to provide a sheet metal needle mounting means that has a large and accurate seating surface. An additional object is to provide a mounting that permits easy replacement of a sheet metal baler needle. A further object is to provide a mounting means for a sheet metal needle that exerts a firm clamping action yet prevents buckling of the needle sides. Yet another object is to provide a mounting means for a sheet metal needle that is a natural by-product of the stamping and bending operations otherwise used to shape the needle.

Drawings

The best mode contemplated for carrying out the present invention is shown in the attached drawings, where:

FIG. 1 shows a partial view of a baler and the general location thereon of the needles;

FIG. 2 shows the sheet metal blank from which a needle is made;

FIG. 3 shows the finished sheet metal needle body;

FIG. 4 shows a section through the needle mounting, taken on line 4—4 of FIG. 1;

FIG. 5 shows a section through the needle, taken on line 5—5 of FIG. 3;

FIG. 6 shows a section through the needle, taken on line 6—6 of FIG. 3.

Description

The baler needle **10** (FIG. 1) disclosed herein is used on balers similar to that shown in U.S. Patent No. 2,770,184 to deliver twine from the twine supply to the knotter mechanism. Needle **10** is attached to the tie pipe **41** on the underside of hay baler **40**, the tie pipe being mounted on pivots **42** on the baler sides and driven by the connecting rod **44** and the bellcrank **43**. Twine strand **35** (FIG. 1) runs through the needle as shown.

Needle **10** (FIGS 3–6) comprises an elongated, curved spine **11** and a pair of walls **12** and **13** projecting from the spine to form a U-shaped cross section. Twine passage **14**, located between walls **12** and **13**, extends the length of the needle. The large, right end of the needle (FIG. 3) contains a curved mounting hole **16** for fitting the needle to a baler tie pipe. The edges of the walls **12** and **13** forming a hole **16** correspond to the form of the tie pipe **41** and provide a seat **15** for mounting purposes. Four tabs **17** are also provided to increase the surface area of seat **15**. Holes **24** to both sides of hole **16** accommodate the legs of the U-bolt used to attach the needle to the tie pipe.

At the tip of the needle, a removable cast iron tip **30**, screwed to the needle body at hole **32** (FIG. 2), is provided to facilitate the delivery of the twine to the knotter. Since the needle tip **30** becomes worn by continuous rubbing of the twine, the tip **30** is made replaceable.

Needle **10** is attached to the baler tie pipe **41** by U-bolt **25** and needle cap **20**, the U-bolt being welded to the tie pipe. The needle is placed over the U-bolt, the legs of the U-bolt passing through holes **24** and twine passage **14**. Needle cap **20** (FIGS. 1 and 4) fits over the legs of the U-bolt and the needle walls **12** and **13** and bears against the outer edges thereof. Washers **26** and nuts **27**, fitted on the legs of U-bolt **25**, hold the needle cap securely in place. The legs **22** and **23** of the needle cap resist the tendency of the walls **12** and **13** of the needle to buckle or spread because of the compressive action of the U-bolt and nut **27** on those walls.

The preferred mode of needle **10** (FIG. 1) is made from a hot rolled steel sheet blank (FIG. 2) that is first sheared to the required overall "developed" flat dimensions. Holes **16**, **24** and **32** are then punched in the blank. After the holes **16**, **24** and **32** are punched, the blank is formed into a channel (FIGS. 5–6). In forming the channel, care is taken to bend the blank symmetrically about the hole **16** so the needle will seat "square" on the tie pipe **41**. Also, the tabs **17** are kept vertical, the relief portions to the sides of the tabs being provided to facilitate this object. The longitudinal bend in the needle is made with a tangent bender. The needle cap is made by conventional metal stamping operations. All of the above operations are done by cold working to hold distortions to a minimum.

Thus, a simple and sturdy mounting means is provided for a sheet metal baler needle. By merely stamping and bending a metal blank, an accurate mounting seat is readily embodied in the needle body. By use of a simple U-bolt and metal cap, a rugged attachment to the baler tie pipe is provided for the needle.

While this description covers only the preferred mode of the invention, the invention is not limited to that mode but embraces as well, all equivalent forms that fall within

the spirit and scope of the attached claims. Specific details have been given as illustrations only and are not to be construed as critical limitations.

What is claimed is:

1. A baler needle, comprising: a needle body including an elongated spine portion and a pair of walls projecting from said spine portion, said walls facing each other to form a U-shaped passage therebetween; a seat for mounting said needle body on a baler needle tie pipe formed in said spine portion and said walls; a needle cap on said needle body, said cap bearing against the outer ends of said walls and extending across said passage; and fastening means for holding said needle cap on said needle body and said needle body on a baler needle tie pipe.

2. A baler needle as recited in claim 1, wherein: said seat comprises an opening formed in said spine portion and said walls, said opening extending from said U-shaped passage to the exterior of said needle body.

3. A baler needle as recited in claim 2, wherein: said needle cap is U-shaped and includes portions extending along the exteriors of said needle body walls to the outer ends thereof and a portion extending across said passage and bearing against the outer ends of said walls, at least one bolt opening in said last-named portion of said needle cap; said fastening means includes a U-bolt for attachment to a baler tie pipe, at least one leg of said U-bolt extending through said seat opening in said spine portion into said needle body passage and through said one bolt openings in said needle cap, and a fastener on said one U-bolt leg holding said needle cap on said needle body.

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LOUIS O. MAASSEL, *Primary Examiner.*