April 6, 1965 C. W. MATTHEWS 3,176,808

PLOW BOLT

Filed Sept. 25, 1961

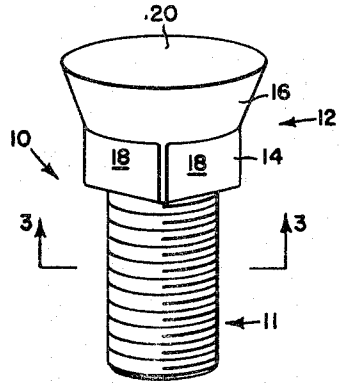


FIG. 1

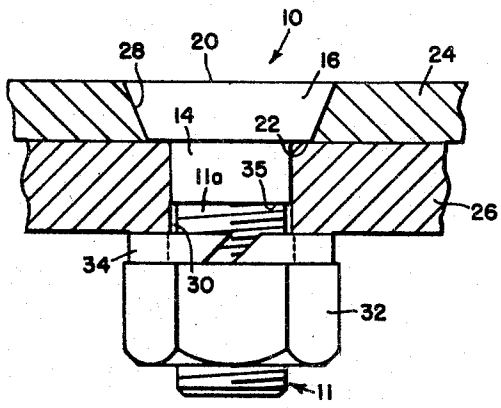


FIG. 2

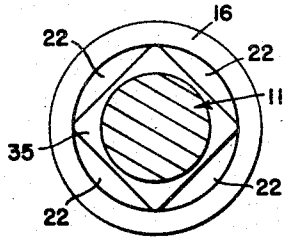


FIG. 3

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PLOW BOLT

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The present invention relates to plows and more particularly to an improved plow bolt.

The object and general nature of the present invention is the provision of new and improved fastening means.

More particularly, it is a feature of this invention to provide a new and improved plow bolt for fastening the share, landslide, and moldboard, or any of them, to the supporting structure or frog of the plow.

Ordinarily, the moldboard, for example, is bolted to the frog or other supporting part by conventional plow bolts. Heretofore, the conventional plow bolt (which is schematically illustrated in U.S. Patent No. 2,337,777 and more fully illustrated on page 7 of the American Standards Association publication ASA B18.9–1958) has been provided with a frusto-conical head which extends into a square neck portion. To receive the conventional plow bolts the moldboard is provided with openings, each having a square portion at the back side and a conical portion at the front side of the moldboard. The square neck portion of the plow bolt engages the square hole formed in the moldboard or like part of the plow, and the conical portion of the bolt engages the conical portion of the opening in the moldboard or other part. The purpose of the squared portions is to keep the bolt from turning when tightening or loosening the bolt and the purpose of the conical portions is to provide a snug close-fitting seat for the bolt head at the outer face of the moldboard. It is to be noted, however, that since both the square and conical portions of the bolt must be kept within the thickness of the moldboard, the avialable space for square portions is severely limited. Further, where the squared portion of the bolt hole is formed in the relatively hard metal of the moldboard share, or other earth engaging part, which have to be hard to resist wear and abrasion, the punches, which are used to form the square holes in the relatively hard material, tend to wear out quickly due to the hard steel normally employed in the moldboard, shares, etc., which hardness is necessary to give the moldboard and other parts good scouring and long wearing properties. As the sharp corners of the punch wears, the corners of the holes in the moldboard become rounded. To prevent frequent changes of punches, the bolt is designed with sufficient clearance to allow for such wear. Also the relatively small square neck portion of the conventional plow bolt is frequently imperfectly formed, sometimes having only two or three sharp corners to engage the square hole in the back portion of the moldboard.

Due to either one or both of the above factors the bolt may tend to rotate in the hole in the moldboard when attempting to remove the latter, as for replacement or repair. This necessitates cutting the bolt off when it is necessary to change the moldboard or other earth working parts of the plow.

The present invention overcomes these disadvantages by modifying both the structure of the plow bolt and the structure of the frog or support and the associated share, moldboard, etc., thereby providing a new cooperation between the earth working part or parts of the plow, and their supporting and fastening structure. By providing the fairly large square opening entirely in the frog or other supporting structure instead of in a small portion of the moldboard, share, etc., punch wear is greatly reduced, for the frog is ordinarily made of a milder steel than the moldboard which prevents rapid and excessive wear on

the punches. Also, a greater bearing surface is presented to the plow bolt because the square opening in the frog extends entirely through the frog. If the square opening were made in the moldboard, only a quarter to one half of the thickness of the moldboard could be employed for the square neck portion of the conventional bolt since the remaining thickness is required for the countersunk head. (This construction is illustrated in U.S. Patents 2,519,326 and 2,527,616.) Applicant's bolt is also provided with rectangular flat side surfaces which will not wear as fast as the side surface of the conventional plow bolt since no curved surfaces interrupt the flat sides as clearly illustrated in Patent No. 2,527,616 and also since they are of greater depth, being equal to the thickness of the moldboard.

With the above features in mind, it is a principal object of the invention to provide a plow bolt which is so constructed and arranged that a first portion of the head non-rotatably engages the supporting structure or frog of a plow while the second portion of the head engages a countersunk hole extending all the way through the moldboard, share, or like supporting structure.

These and other objects of the present invention will be apparent to those skilled in the art after a consideration of the following detailed description, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of a plow bolt incorporating the features of the present invention, and

FIG. 2 is a view of the plow bolt of this invention, with the cooperating associated frog and moldboard shown in section, incorporating the features of the present invention.

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 1.

Referring first to FIG. 1, applicant has provided a plow bolt 10 having a threaded shank 11 and a head indicated generally at 12. The head has a first portion 14 and a frusto-conical second portion 16. As can best be seen in FIG. 2 the first and second portions of the head 12 are concentrically arranged with respect to the threaded shank 11.

The first portion 14 has a generally box-like configuration, in which the four side faces 18 are rectangular and lie in planes parallel to the axis of the threaded shank 11. The portion 14 has a substantially square cross section taken on a plane normal to the axis of the threaded shank 11.

The second portion 16 has a frusto-conical configuration having a large end face 20, and a small end face 22 (FIG. 3) in which the small end face is adjacent the squared first portion and has a diameter equal to the length of the diagonal of the cross section of the first portion 14. The large end face 20 has a substantially flat surface which is parallel to the face 22 and normal to the axis of the shank.

Referring now to FIG. 2, the plow bolt 10 is seen associated with a moldboard 24 and a supporting member or frog 26 of a plow. The moldboard and frog are of novel construction, particularly adapted to cooperate with the bolt 10. The moldboard 24 is provided with a countersunk hole 28 extending entirely through the moldboard and the frog is provided with a square opening 30 extending entirely through the frog 26. The plow bolt is passed through the hole 28 and the opening 30, the first portion 14 closely fitting within the opening 30 to prevent relative rotation of the bolt with respect to the frog, the second portion 16 fitting within the countersunk hole 28. The bolt is securely fastened by nut 32 and lock-washer 34 whereby the moldboard is drawn into tight engagement with the frog 26. Preferably, the axial dimension of the squared portion 14 is somewhat less than the thickness of the supporting frog, so that when

the bolt is drawn up tight, the nut 32 will not be brought into engagement with the unthreaded portion 11*a* of the shank immediately adjacent the lower face 35 of the squared portion 14.

Since the punches used to form the square hole in the supporting frog work only in the softer metal of the frog, and not in the hard metal of the moldboard, share, shin, etc., as in the prior art, the punch life is longer and the openings formed thereby always sharp and clear, and also materially deeper than prior art construction. Hence, there is little likelihood of the bolts ever turning in the frog when tightening or removing the bolts.

While I have shown and described above the preferred structure in which the principles of the present invention have been incorporated, it is to be understood that my invention is not to be limited to the particular means shown and described above, but that, in fact, widely different means may be employed in the practice of the broader aspects of my invention.

What I claim, therefore, and desire to secure by Letters Patent is:

1. A construction comprising a first part having a bolt-receiving opening therein, said opening being of non-circular cross-section, a second part having a countersunk bolt-receiving hole extending entirely through said second part and in register with said opening, said second part being normally separable from said first part and fastener means holding said first part to said second part, said fastener means including a bolt having a head and a threaded shank, said head having a first portion and a second portion, said first portion being adjacent to said shank and having a non-circular cross-section taken normal to the axis of said shank, said first portion being non-rotatably seated within said opening, and said second portion being adjacent to said first portion and flared outwardly from said first portion, said second portion being seated within and substantially filling said hole, the parts being so arranged and constructed that said second portion engages only said countersunk hole and said first portion engages only said non-circular opening.

2. In an earth working implement: a supporting member having an opening which is polygonal in cross-section, an earth working part fixed to said supporting member and having a countersunk bolt-receiving hole extending entirely through said earth working part and in register with said first mentioned opening, and fastener means holding said supporting member to said earth working part, said fastener means including a bolt having a head and a threaded shank, said head having a first portion

and a second portion, said first portion being adjacent one end of said shank and having a polygonal cross-section taken on a plane normal to the axis of said shank, the sides of the first portion being substantially flat and of a rectangular configuration, said side lying in a plane parallel to the axis of said shank, said first portion being non-rotatably seated in said polygonal opening, and said second portion being adjacent to said first portion and having a frusto-conical configuration, said second portion being seated in and substantially filling said countersunk hole, the parts being so arranged and constructed that said second frusto-conical portion engages only said countersunk hole, and said first portion engages only the polygonal opening.

3. In a plow bottom: a supporting member having a square plow bolt-receiving opening, a moldboard or other plow part fixed to said supporting member and having a countersunk plow bolt-receiving hole extending entirely through said part and in register with said first mentioned opening, and fastening means holding said supporting member to said moldboard or other plow part, said fastener means including a plow bolt comprising a shank and a head on said plow bolt, said head having a first portion which is square in a cross-section taken normal to the axis of the shank, and which lies adjacent to said shank, said first portion having flat rectangularly shaped faces which lie in a plane parallel to the axis of the shank, said first portion being non-rotatably seated in said square opening, and a frusto-conical second portion which is adjacent said first portion, the smaller end surface of the frusto-conical portion being normal to the longitudinal axis of the bolt and adjacent the first portion, said smaller end surface having a diameter substantially equal to the diagonal of the square cross-section, said second portion being seated in and substantially filling said countersunk hole, the parts being so arranged and constructed that said frusto-conical portion engages only said countersunk hole in the moldboard or other plow part and said first portion engages only the square opening in the supporting member.

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HARRISON R. MOSELEY, *Primary Examiner.*

JOEL REZNEK, *Examiner.*