ABSTRACT

A universal trashboard for moldboard plows which may be mounted on various plows made by different manufacturers having bolt hole spacings which vary from one plow design to another. The universal trashboard utilizes series of interchangeable plugs in the trashboard containing bolt holes positioned in the plugs such that when a plug is mounted in the trashboard the bolt hole spacing may be varied with the selection of the plug and according to the position of the plug as mounted in the trashboard.

4 Claims, 19 Drawing Figures
UNIVERSAL TRASHBOARD FOR MOLDBOARD PLOWS

BACKGROUND OF THE INVENTION

Heretofore trashboards have been mounted on moldboard plows and have been bolted to the moldboard but in many trashboard designs they were bolted directly to the moldboard and since the plows of different manufacturers had different mounting arrangements it became necessary to more or less custom make the trashboard for each design of plow. In order to avoid the necessity for stocking trashboards of varying design to accommodate the mounting facilities presented by the multitude of different plows it has been the practice of some manufacturers of this type of equipment to design trashboard for mounting by means of separate brackets whereby to adapt a trashboard for mounting on various plows but in this case it became necessary to stock such mounting brackets in various designs suited to the different installation requirements. The bolt hole spacing for mounting the trashboard on the plows of various manufacturers has differed to such extent heretofore that no one manufacturer has been able to provide one design for a trashboard that could be fitted to and mounted on the trashboard of any plow design with means for adapting the mounting thereof to suit the bolt hole spacing arrangements provided by all manufacturers.

OBJECTS OF THE INVENTION

It is the primary purpose of this invention to provide a trashboard for moldboard plows that can be adapted for mounting on the moldboard of any plow manufacturer regardless of the bolt hole spacing provided on the plows.

The principal object of the invention is the provision of a universal trashboard for moldboard plows which is molded from a suitable high density plastic and which incorporates means within the trashboard design adapting it for installation on plows having varying mounting facilities.

Another object of the invention is to provide a universal trashboard for moldboard plows having one or more openings through the trashboard and a separate plug in at least one of said openings.

A further object of the invention is the provision of a universal trashboard having at least one opening therethrough and series of removable plugs each having a differently located hole interchangeably mountable in said opening.

A further object of the invention is to provide a universal trashboard having a plurality openings therethrough and one or more removable plugs in certain of the openings and one of said plugs having a plane surface flush with a face of the trashboard and one of the plugs having a hole therethrough for a fastening securing the trashboard to a moldboard plow.

A still further object of the invention is the provision of a universal trashboard having at least one opening therethrough and a removable plug in the opening wherein the opening and plug are of rectangular configuration with an off center hole through the plug and the plug is reversible in the opening to change the location of the hole.

Another object of the invention is to provide a universal trashboard having an opening therethrough and a plane faced plug in the opening disposed flush with a face of the trashboard with at least one fastening securing the plug to the trashboard by means of threads partially engaging the plug and partially engaging the trashboard on respectively opposite sides of the axis of the fastening.

Still another object of the invention is the provision of a universal trashboard having an opening and a removable plug in the opening with the plug and the opening having one or more offset ledges extending around the edges thereof with a hole through the plug and a fastening through the hole securing the plug in the hole and the trashboard to a moldboard plow.

The foregoing and other objects of the invention are attained by the trashboard structure and removable and interchangeable plug arrangement illustrated in the accompanying drawings wherein:

FIG. 1 is a general perspective view of a moldboard plow having the trashboard of this invention installed in accordance with the teachings hereof;

FIG. 2 is a detail elevational view to larger scale showing the attachment of the trashboard to the moldboard plow from the rear side of the installation;

FIG. 3 is an exploded perspective view of the parts comprising the trashboard assembly;

FIG. 4 is a detail elevational view to larger scale of the attaching portion of the trashboard from the front or working face thereof;

FIG. 5 is a detail elevational view of the same attaching portion shown in FIG. 4 but illustrating the rear face of the trashboard;

FIG. 6 is a vertical cross sectional view through the attaching portion of the trashboard taken on the line 6—6 of FIG. 4;

FIGS. 7, 8, 9, 10, 11, 12, 13 and 14 are detail drawings to larger scale illustrating four removable and interchangeable plug installations for the trashboard shown respectively in plan and edge elevation views; and

FIGS. 15, 16, 17, 18 and 19 comprise detail drawings of the attaching portion of the trashboard showing the front face or working surface thereof with the various types of removable plugs installed to illustrate the several arrangements thereof.

SUMMARY OF THE INVENTION

The trashboard disclosed herein is universally adaptable for installation on any make of moldboard plow and accomplishes this in a unique manner. The trashboard is constructed of plastic comprising a high density material of this type such as polyethylene and includes a plurality of removable plugs of similar material that are interchangeably mounted in corresponding openings provided in the trashboard. The removable plastic plugs contain bolt holes disposed so that the spacing and arrangement of mounting bolt holes in the trashboard can be varied by interchanging the plugs or by reversing certain plugs whereby the trashboard can be fitted to any make of moldboard plow with the bolt holes in the trashboard conforming to the spacing and arrangement of the mounting bolt holes provided on any particular make of plow.

The removable plugs, when installed in the trashboard, are disposed flush with the working face thereof and the trashboard includes means for mounting at least a portion thereof substantially flush with the working face of a moldboard plow so that a smooth un-
interrupted flow of soil and surface trash is obtained during movements of the plow through the ground. In some cases the removable plastic plugs are secured in place in the trashboard by the same mounting bolts securing the trashboard to the moldboard plow while in other cases certain of the plugs are secured in the trashboard by a unique fastening means engaged partially in the plug and partially in the plastic trashboard.

In the operation of a moldboard plow with this trashboard thereon, surface trash, cover crops, cornstalks, weeds, etc., are turned over into the plowed furrow so that such trash is buried therein during the continuing plowing operation so that more complete decomposition thereof can take place for more effective preparation of the field soil for the subsequent planting operations.

A feature of this trashboard fabricated from a high density plastic such as polyethylene includes a cut-out portion or notch forming a relief area which has the effect of reducing the frontal surface contacting the soil being turned and thereby reduce the level of the forces to which the plastic trashboard otherwise would be subjected during normal plowing operations by permitting some of the turning soil to be discharged through the relief area thus dissipating at least some of the forces involved and without passing any of the surface trash through the notched opening.

DESCRIPTION OF PREFERRED EMBODIMENT

In the drawings 10 represents the general indication of a typical moldboard plow which, as shown in FIG. 1, is secured to a beam 11 in accordance with usual practice. Trashboard 12 is secured to the moldboard plow with at least a portion of the front face or working surface of the trashboard disposed substantially flush or coplanar with the working face of the moldboard. This coplanar relationship occurs generally in the area of the mounting or attaching area of the trashboard with respect to the moldboard, as best indicated in FIG. 1. This flush mounting is obtained by means of a depending lip 13 on the trashboard. This lip 13 is disposed at the rear side of the trashboard, as best shown in FIGS. 3 and 6, and extends downwardly behind the upper edge of the moldboard, as best indicated in FIG. 2.

With the depending lip 13 disposed behind the moldboard the front surface or working face of the trashboard is disposed flush with the front face of the moldboard 10 thereby to present a continuously smooth surface to soil and surface trash engaged by the plow in operating service and thus no impediment is presented to the smooth flowing operation of the turning soil. The lip 13 is continuous and of substantial length such as to extend throughout the attaching area of the trashboard to the moldboard. In this area the shoulder 14 on the trashboard engages the top edge of the moldboard with the front face 15 of the trashboard substantially flush with the front face 16 of the moldboard.

The trashboard 12 immediately after the attaching portion thereof curves inwardly over the top edge of the moldboard plow, as best shown in FIG. 1 and indicated by the curvature of the trashboard revealed in FIG. 3, and it is this curvature of the trashboard that has the effect of causing the surface trash engaged thereby to be turned over into the plowed furrow and buried therein. The curved free end of the trashboard, as shown in these Figures, is provided with a soil pressure relief area in the form of an opening or notch 17 which, in operation, allows a portion of the plowed soil to discharge therethrough to reduce the forces and thereby relieve the pressure on the trashboard without allowing any significant amount of surface trash to pass through the relief opening.

The trashboard being fabricated entirely of a high density plastic material such as polyethylene is reinforced on the back side thereof, as shown in FIGS. 5 and 6, by a pattern of interconnecting ribs 18 which are formed integrally therewith and designed to strengthen the trashboard in all directions. As is best seen in FIG. 5 the areas surrounding openings 20, 21 and 22 are heavily reinforced by solid boss area 23, 24, and 25. These heavily reinforcing boss areas taken with the pattern of reinforcing ribs 18 and the edge reinforcing ribs 19 extending substantially around the entire area of the trashboard provide a very strong construction against the forces involved or any possibility of breakage while turning over the soil and surface trash.

All of the openings 20, 21 and 22 are of rectangular configuration, the openings 20 and 21 each being a true square while the opening 22 is elongated. The opening 20 and 21 are countersunk and the rectangular opening 22 is provided with a series of stepped shoulders 27 extending continuously around the opening, see especially FIGS. 4 and 6. The plastic trashboard is mounted on the moldboard plow 10 by means of mounting bolts 28 secured by nuts 30 on washers 29. Bolts of this type are adapted to extend directly through the holes 20 and 21 for attachment of the trashboard to the moldboard and it will be noted that the bolts have a square shank portion 31 for engagement in the square openings through the trashboard while a countersunk head 32 engages the countersunk portion 26 of the openings.

On the moldboard plows of certain manufacturers only one of the openings 20 or 21 may be utilized for the passage of a mounting bolt 28 for the attachment of the trashboard to such plows whereupon in this design the other opening, 21 as shown, is closed by means of a removable plastic plug 33. As shown in FIGS. 3, 7 and 8, this plug, which is made of a high density plastic material such as polyethylene, similar to the material of the trashboard, has a square shank portion 34 to engage in and fit the opening 21 and a countersunk head 35 to engage the countersunk seat portion 26 around the bolt hole opening. The shank 34 of the plastic plug is provided with a threaded opening 36 to receive a screw 37 by means of which the plug is secured in the opening 21 either by the expansion of the shank due to the insertion of such screw of proper size whereby the thus expanded shank portion tightly engages the opening 21 and is retained by friction induced by the pressure resulting from the expanded plug or, a suitable washer might be installed on the opposite side of that part of the moldboard to which the trashboard is secured thereby to retain the plug in the opening flush with the face of the trashboard because of the countersunk relationship of the head portion 35 in the countersunk hole. As indicated in FIG. 3, the hole 20 is adapted to be engaged directly by the mounting bolt 28 in securing the trashboard onto the moldboard 10 so that only one of those holes is plugged for this particular installation and the other hole is utilized for the mounting bolt in the securement of the trashboard on the moldboard.
The opening 22 through the trashboard also is adapted to have a plastic plug inserted therein and while the plastic plug 33 as described for the opening 21 is removable and interchangeable between the openings 20 and 21 according to the specific requirements dictated by the circumstances surrounding particular installations on the various moldboard plows of different manufacturers, the plug provided for the opening 22 comes in the form of a set of plugs 40, 41 and 42 all of which are removable and interchangeable one with the other and each of which fits exactly within the opening 22. The plugs 40, 41 and 42 of this set not only are interchangeable with each other for use respectively in the application of the trashboard 12 to different makes of moldboard plows, but certain of the plugs are reversible whereby further to vary the applicability of the trashboard to various makes of plows and adapt the present trashboard mounting to the mounting bolt arrangement provided on any of the several plow designs marketed by the various manufacturers.

The plug 40, which is molded from a high density plastic material such as polyethylene, comprises a blank having a smooth front face in the form of a plane surface 44 and is used in the opening 22 when a particular make of moldboard plow does not require a mounting bolt at this location and it is desired to provide a continuous, smooth, flat surface on the face of the trashboard. The plug 40, as best revealed in FIGS. 9 and 10, is provided with stepped shoulders 38 extending entirely around the plug and which are disposed complemental to the shoulders 27 in the opening 22 when the plug is installed in the opening. The plug fits the opening precisely and the complementary engagement between the opposed shoulders 27 and 38 is such that the plane surface 44 on the front face of the plug is disposed flush with the surrounding face 15 of the trashboard 12 thereby to provide an overall smooth, flat surface on the trashboard.

A rectangular plug portion 39 on the member 40 extends into the correspondingly shaped opening 22 and projects through the opening to the back side of the trashboard. The plug portion 39 fits the rectangular opening 22 precisely on all four sides so that the plug 40 is positioned exactly in the opening therefor in the trashboard. The plug 40 is retained in the opening 22 by screws 43 which are threaded into the holes 45 provided therefor in the plug body. The plug portion 39 is provided with recesses 46 for the heads of the screws 43 and the adjacent end wall portions of the opening 22 in the trashboard are similarly recessed, as at 47, (see FIG. 5) so that the screws do not project beyond the plane of the rear side of the trashboard when the plug 40 is installed and secured by the screws 43. It will be noted, particularly as shown in FIG. 10, that the screws 43 are adapted to be engaged but partially in the plug 40 in that area where the screws pass through the plug portion 39. In fact only half of the threaded portion of each screw in this area is engaged by the plug portion 39 and the remaining half of these threads is engaged by the respective end walls of the opening 22. The screws 43 thus securely retain the plug 40 in the trashboard opening without projecting beyond the rear face of the trashboard and with the front face 44 of the plug disposed flush with the working face 15 of the trashboard. The screws 43 may be of the self-tapping variety.

The removable plugs 41 and 42 are interchangeable with the plug 40 and like that plug are made from a high density plastic material such as polyethylene similar to that of the trashboard. Plugs 41 and 42 are of similar design but the bolt hole 49 in the respective plugs is located differently to provide for variations in bolt hole spacing in the trashboard to adapt the trashboard for mounting on various makes of moldboard plows having different spacing of the holes provided for mounting bolts to secure the trashboard on the moldboard. The bolt holes 49 are square to fit the square shank section 31 of the mounting bolts 28 and are countersunk, as at 50, to accommodate the countersunk head 32 of the bolts. It will be seen from a comparison of FIGS. 11 and 13 that the bolt hole 49 in the plug 41 is offset from center somewhat less than the hole 49 in the plug 42 so that by the choice of one or the other of the plugs for mounting in the trashboard hole 22 the spacing and relationship of this hole with respect to the bolt holes 20 and 21 can be varied in accordance with the spacing of the mounting bolt holes on practically any make of moldboard plow.

Some of the variations in bolt hole spacing and arrangement available with this trashboard design are illustrated in FIGS. 15 through 19 where the several plugs 33, 40, 41 and 42 are shown as disposed to accommodate various mounting bolt arrangements. In FIG. 15 bolt hole 21 is blanked out by the plug 33 and the plug 42 is disposed in the opening 22 in a manner to provide a bolt hole spacing A with respect to the bolt hole 20. In FIG. 16 the bolt hole 21 is again blanked out by the plug 33 secured therein but the plug 42 has been turned around or reversed to provide bolt hole spacing B in relation to bolt hole 20.

FIG. 17 again shows the bolt hole 21 blanked out by the plug 33 but illustrates plug 41 in the opening 22 disposed to provide a mounting bolt hole spacing C with respect to the bolt hole 20. In FIG. 18, which also shows bolt hole 21 blanked out by plug 33, the plug 41 has been reversed to provide a bolt hole spacing D in relation to the mounting bolt hole 20. FIG. 19 illustrates the use of the plane faced plug 40 mounted in the opening 22, as described hereinbefore, to provide a smooth, flat, continuous surface on the face 15 of the trashboard when the opening 22 is not utilized for one of the plugs 41 or 42 to accommodate a mounting bolt in the installation of the trashboard on a particular make of plow. In this arrangement the bolt holes 20 and 21 are used for securing the trashboard on this plow having the mounting bolt hole relation and spacing E shown in this Figure.

The bolt hole spacing E is the same in all of the drawing Figures since the relationship of these mounting bolt holes is standard and the same on all trashboards and correspondingly arranged mounting bolt holes are provided on all makes of moldboard plows by the various manufacturers. Thus it will be realized that all manufacturers of moldboard plows do not utilize three mounting bolts and where less than the three bolts are used the manufacturers do not necessarily use the same two mounting bolt holes so that to adapt the present trashboard for application to all designs and makes of moldboard plows it has been made universally adaptable to all of the plow makes by providing a variable arrangement of the bolt holes whereby either two or three bolts may be utilized for mounting the trashboard and the spacing varied in either case to accommodate
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the mounting arrangement used by any manufacturer.

Referring to FIGS. 11 through 14, the removable plastic plugs 41 and 42 are shown as having offset shoulders 47 extending entirely around the respective plugs adapted to be disposed complementarily in engagement with the shoulders 27 and 47. The engaged shoulders 27 and 47 thus position the selected plug in the mounting opening with the hole 49 properly located according to the disposition of the plug and with the face of the plug disposed flush with the face 15 of the trashboard. A plug portion 48 extends into the opening 22 substantially to the rear side of the trashboard and the bolt hole 49 is coextensive with the depth of this plug portion. The mounting bolt 28 that extends through the plug selected for the opening 22 and which secures the trashboard 12 on a moldboard plow 10, also serves to retain the plug 41 or 42, as the case may be, properly mounted in the trashboard opening 22 so that when installed on a plow plug becomes a permanent part of the installation.

FIG. 2 illustrates one manner of attaching the trashboard 12 to a moldboard plow 10 wherein the bolt holes 20 and 21 are utilized for mounting the trashboard. Mounting bolts 28 which pass through the holes 20 and 21 are shown extending through and secured on the back side of a plate 51 by means of the washers 29 and nuts 30. The plate 51 is mounted directly on the moldboard 10 where it is secured by means of bolts 52 secured by nuts 53 with the heads 54 of these bolts countersunk with the face of the moldboard at the opposite side thereof, as shown in FIG. 1, whereby to maintain a smooth, uninterrupted working face 16 on the plow 10. On different makes of moldboard plows however the installation of the trashboard will vary because of the several arrangements for trashboard mounting used by some of the manufacturers. The mounting arrangement shown in FIG. 2, of course, comprises a rear view of the type of trashboard installation illustrated in FIG. 1 where a blank plug 40 is utilized in opening 22 and mounting bolts 28 through the bolt holes 20 and 21 secure the trashboard 12 to the plow 10. The mounting plate 51, in FIG. 2, conceals the rear face of plug 40 from view so that only the mounting bolts 28 are seen where they project through the mounting plate.

From the foregoing it will be seen that a universally adaptable mounting arrangement has been provided for securing a trashboard to various makes of moldboard plows by utilizing removable and interchangeable plugs in the trashboard containing bolt holes arranged to vary the spacing and arrangement of the bolt holes by interchanging or reversing the plugs and wherein the trashboard and plugs are molded from a high density plastic material such as polyethylene or the like.

We claim:

1. A trashboard for attachment to a moldboard plow by fastenings extending through a base attaching portion of the trashboard for securement to the moldboard of the plow, a plurality of openings through said base attaching portion, and a first removable plug in each of said openings, at least one of said first plugs having a hole for the passage of a fastening therethrough, said first plug being interchangeable with a second plug having a hole located on a center different from the center of the first named hole in said one first plug, at least certain of said openings being rectangular and having a shoulder about the opening and a rectangular plug in said opening having a complementary shoulder engaged with said shoulder in the opening to dispose the plug flush with a face of said trashboard.

2. A trashboard for attachment to a moldboard plow as set forth in claim 1 wherein said one first plug is of rectangular configuration and said hole in the one first plug is located off center therein, and said rectangular plug is reversible in said opening to change the location of said fastening through the trashboard.

3. A trashboard for attachment to a moldboard plow as set forth in claim 1 wherein said trashboard includes integrally formed rigidifying reinforcing ribs on the backside thereof, certain of said reinforcing ribs being formed in an interconnecting pattern to stiffen the trashboard in all directions, and certain of said reinforcing ribs intersect at angles with a plurality of such ribs extending in parallel relation in the longitudinal direction of the trashboard.

4. A trashboard for attachment to a moldboard plow having a plurality of openings through a base attaching portion for the passage of fastenings securing the trashboard to the moldboard of the plow, an additional opening through said attaching portion, a plug in the additional opening, said plug having a plane face disposed flush with the face of the trashboard, said additional opening and said plug being of rectangular configuration, and fastening means securing said plug in said opening, said fastening means having threads engageable partially in said plug and partially in said trashboard at respectively opposite sides of the axis of the fastening means.