J. BUCHANAN.

PLOW.

APPLICATION FILED AUG. 17, 1915.

1,250,962. Patented Dec. 25, 1917.

Fig. 1

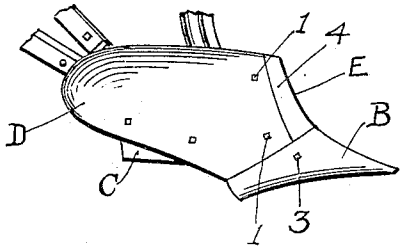


Fig. 2

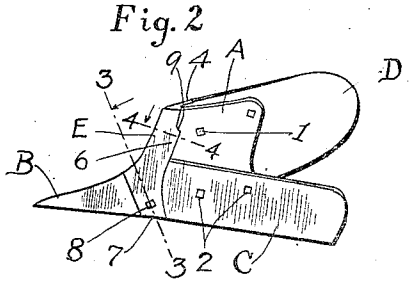


Fig. 3

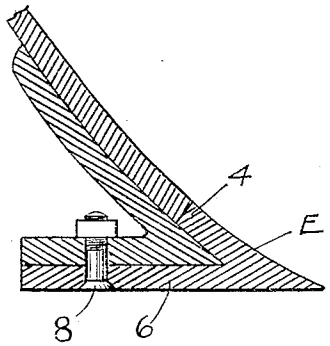


Fig. 4

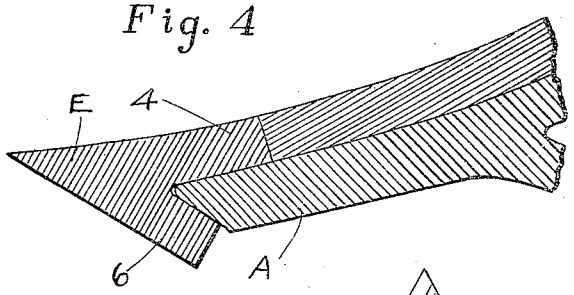


Fig. 5

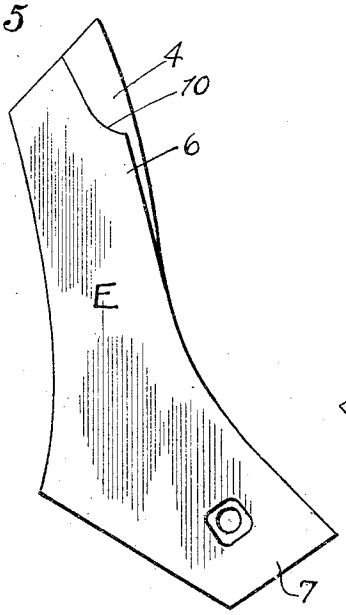
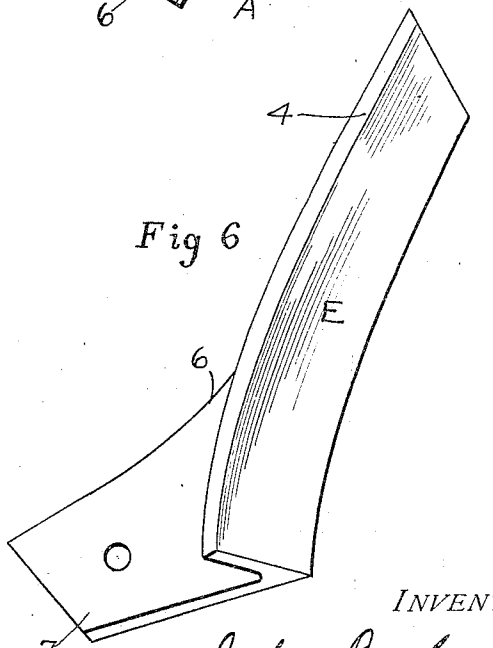


Fig 6



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PLOW.

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Application filed August 17, 1915. Serial No. 45,910.

To all whom it may concern:

Be it known that I, JUDSON BUCHANAN, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented a new and useful Improvement in Plows, of which the following is a specification, reference being had to the accompanying drawing.

My improvement relates particularly to plows having at one side a stationary moldboard and at the other side a stationary, upright land side and having a share forward of the moldboard and the land side and having above the share and along the front of the moldboard a cast metal shin piece with one surface curved to conform to the general curvature of the share and the moldboard and with another surface which is flat and conforms to the flat outer face of the land side of the adjacent portion of the share.

One object of the invention is to produce a structure the parts of which are well adapted to convenient assembly and to the convenient removal of parts most frequently requiring repairing or replacing. A further object of the invention is to so shape the shin piece as to impart to it the greatest possible strength while it is at the same time made extremely hard, such hardness being essential to avoid reduction by wear.

In the accompanying drawings,

Figure 1 is an oblique side view of the moldboard side of a plow embodying my improvement, the handles and the beam being broken off;

Fig. 2 is a view of the moldboard side of the plow base, the handles having been entirely removed;

Fig. 3 is a section on the line, 3—3, of Fig. 2;

Fig. 4 is a section on the line, 4—4, of Fig. 2;

Fig. 5 is a view of the land side side of the shin piece detached from the plow;

Fig. 6 is a view of the shin piece from the opposite direction.

Referring to said drawings, A is the frog or standard, B is the share, C is the land side, D is the moldboard, and E is the shin piece.

The moldboard side of the frog, A, is curved to conform to the forward portion of the moldboard, the shin piece, and the share. The lower portion of the opposite side of the frog conforms to the inner face of the land side and to the adjacent portions of the shin piece and the share. The moldboard is secured to the frog by means of bolts, 1, 1, extending through said members. The land side, C, is secured to the frog by means of bolts, 2, 2, extending through said members. The share, B, is secured to the frog by means of a bolt, 3, extending through said members at the moldboard side of the plow.

On the moldboard side of the plow, the shin piece has a flange, 4, on which is an outer curved face forming a continuation of the outer face of the adjacent portion of the moldboard and share; and on the land side of the plow, the shin piece has an upright flange, 6, having an outer flat face lying in the plane of the outer face of the land side and of the land side face of the share, so that said three faces form a continuous straight and upright face. On the moldboard side, the shin piece extends from the upper edge of the share upward as high as the upper edge of the forward portion of the moldboard, and said flange of the shin piece is of approximately uniform width from the share upward. On the land side side of the plow, the flange, 6, of the shin piece extends downward between the share and the land side even with the lower edges of said members. Said extended portion forms a tongue, 7, which rests flatwise against the adjacent portion of the frog, A, and is secured thereto by means of a bolt, 8, penetrating said extension and the frog.

The flanges, 4 and 6, stand at an acute angle to each other, and because of the presence of said flanges in such form, the shin piece is a channel member or angle member, the flanges being relatively thin and separated by a V-shape groove or channel.

The forward edge of the frog, A, extends into said channel. At the upper portion of said edge the frog has a forward extension forming a downward-directed shoulder, 9, and the adjacent portion of the flange, 6, is cut away to form a corresponding upward-directed shoulder, 10, the shoulder, 9, constituting an abutment against which the shoulder, 10, bears. This engagement prevents upward movement of the shin piece, and the engagement of the rear edges of the flanges, 4 and 6, with the forward edges of the land side, the moldboard, and the frog, and the engagement of the frog with the shin piece in said channel prevent rear-

ward movement of the shin piece under the great stresses applied to said shin piece while the plow is being forced through the ground and against obstructions in or on the ground. These engagements are of such nature and so efficient as to overcome practically all stresses tending to remove the shin piece during the operation of the plow, so that the bolt, 8, need only resist unimportant stresses applied to the shin piece in other directions.

When it is desired to remove the shin piece, it is released by the removal of the bolt, 8. When that bolt has been removed, the shin piece is free from all the other parts of the plow and may be removed without disturbing other parts.

In the use of the plow, the shin piece is not only subjected to great strains, but also to grinding and blows against stone and other hard objects; and, in order to work satisfactorily, the shin piece should constantly present a sharp front edge. These conditions make it desirable that the metal of the shin piece be extremely hard. Such hardness is attained by "chilling," and this process makes the cast iron brittle. The greater the degree of hardness thus attained, the more readily will the metal fracture. Furthermore, the casting operation comprising the element of chilling can be done best if the metal is not thick. But, obviously, the thinner the metal is, the more easily it will break.

In my improved structure, the shin piece has two thin parts (the flanges, 4 and 6,) combined and opposed to each other in such manner as to make the resulting shin piece strong, although it is composed of metal rendered brittle by "chilling" and the parts are thin in cross-section.

The flange, 4, is thin and brittle and would, by itself, break under moderate stresses; and the flange, 6, is also thin and brittle and would, by itself, break under moderate stresses. But, by being joined each is given the benefit of the cross-sectional area of the other, and being joined at their forward edges to form a channeled piece which is angular in cross-section, each flange lends support to the other, stresses applied to either flange sidewise or in the direction of the thickness (and not in the direction of the width) being applied approximately through the width of the other flange.

Furthermore, as above indicated, such chilling can be best accomplished when the part to be chilled is not thick. This is an added reason for forming the channel whereby the thin flanges are produced. In casting the shin pieces, two "chills" and a core are used, the "chills" being placed to form the outer faces of the flanges, 4 and 6, and the core being placed to form the groove or channel between the flanges.

Obviously the greater strains tending to fracture the shin piece transversely are applied between the two ends of the shin piece. Hence I have developed the two flanges through that region of the shin piece. The flange, 6, is not so fully developed above the shoulder, 10; but I have found by trial and experimenting that that portion of the shin piece is above the region exposed to the greater stresses.

Extended trial of the shin piece in the form shown has made it clear that in this form the metal may be made very hard and well adapted, notwithstanding such hardness, to severe usage without the previous fractures.

I claim as my invention,

1. In a plow structure of the nature described, the combination with a frog or standard, a moldboard, a land side, and a share secured to the frog, of a shin piece located upon the front of the frog above the share and in front of the moldboard and the land side and comprising two flanges highly hardened on their outer faces and joined to each other at the front and both extending over substantially the length of the shin piece and both bearing against the frog, and one having its outer face in the plane of the outer face of the land side and the other having its outer face curved and conforming to the adjacent outer face of the moldboard, whereby said shin piece is made V-shape in cross-section, and means for detachably securing the shin piece to said frog, substantially as described.

2. In a plow structure of the nature described, the combination with a frog or standard, a moldboard, a land side, and a share secured to the frog, of a shin piece located upon the front of the frog above the share and in front of the moldboard and the land side and comprising two flanges highly hardened on their outer faces and joined to each other at the front and both extending over substantially the length of the shin piece and both bearing against the frog, and one having its outer face in the plane of the outer face of the land side and the other having its outer face curved and conforming to the adjacent outer face of the moldboard, whereby said shin piece is made V-shape in cross-section, and the landside flange being extended downward to form a tongue, and means for detachably securing said tongue to said frog, substantially as described.

3. In a plow structure of the nature described, the combination with a frog or standard having a shoulder, a moldboard, a land side, and a share secured to the frog, of a shin piece located upon the front of the frog above the share and in front of the moldboard and the land side and comprising two flanges highly hardened on their outer faces and

joined to each other at the front and both extending over substantially the length of the shin piece and both bearing against the frog, and one having its outer face in the plane of the outer face of the land side and having a shoulder and the other having its outer face curved and conforming to the adjacent outer face of the moldboard, whereby said shin piece is made V-shape in cross-section, and means for detachably securing the shin piece to said frog, substantially as described.

4. In a plow structure of the nature described, the combination with a frog or standard having a shoulder, a moldboard, a land side, and a share secured to the frog, of a shin piece located upon the front of the frog above the share and in front of the moldboard and the land side and comprising two flanges highly hardened on their outer faces and joined to each other at the front and both extending over substantially the length of the shin piece and both bearing against the frog, and one having its outer face in the plane of the outer face of the land side and having a shoulder and the other having its outer face curved and conforming to the adjacent outer face of the moldboard, whereby said shin piece is made V-shape in cross-section, and the landside flange being extended downward to form a tongue, and means for detachably securing said tongue to said frog, substantially as described.

5. In a plow structure of the nature described, the combination with a frog or standard, a moldboard, a land side, and a share secured to the frog, of a shin piece located upon the front of the frog above the share and in front of the moldboard and the land side and comprising two flanges highly hardened on their outer faces and joined to each other at the front and both extending over substantially the length of the shin piece and both bearing against the frog, and receiving the forward portion of the frog between them and one having its outer face in the plane of the outer face of the land side and the other having its outer face curved and conforming to the adjacent outer face of the moldboard and means for detachably securing the shin piece to said frog, substantially as described.

6. In a plow structure of the nature described, the combination with a frog or standard, a moldboard, a land side, and a share secured to the frog, of a shin piece located upon the front of the frog above the share and in front of the moldboard and the land side and comprising two flanges highly hardened on their outer faces and joined to each other at the front and one having its outer face in the plane of the outer face of the land side and the other having its outer face curved and conforming to the adjacent outer face of the moldboard, whereby said shin piece is made V-shape in cross-section, and the land side flange being extended downward to form a tongue extending downward over the frog even with the lower edge of the land side and the lower edge of the share, and means for detachably securing said tongue to said frog, substantially as described.

In testimony whereof I have signed my name this 31 day of July, in the year one thousand nine hundred and fifteen.

JUDSON BUCHANAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."