

A. SMITH.
Plow-Moldboard.

No. 3,576.

Patented May 6, 1844.

Fig. 3.



Fig. 6.

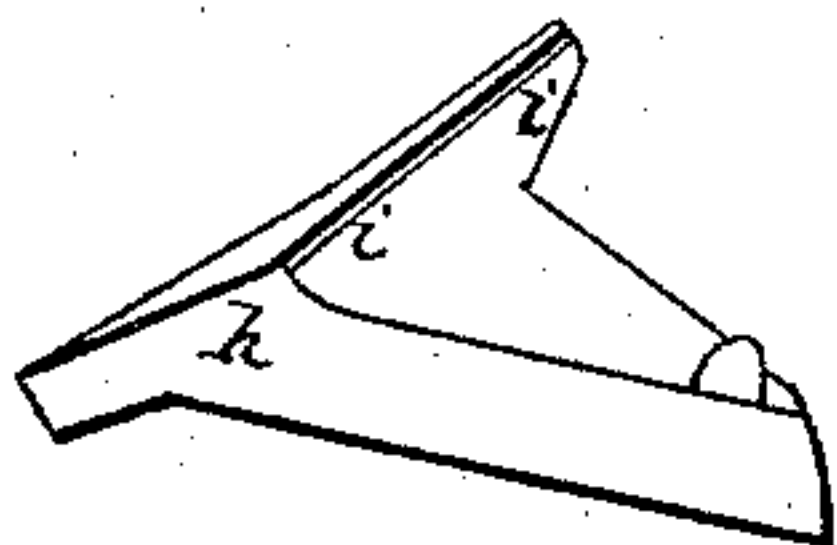
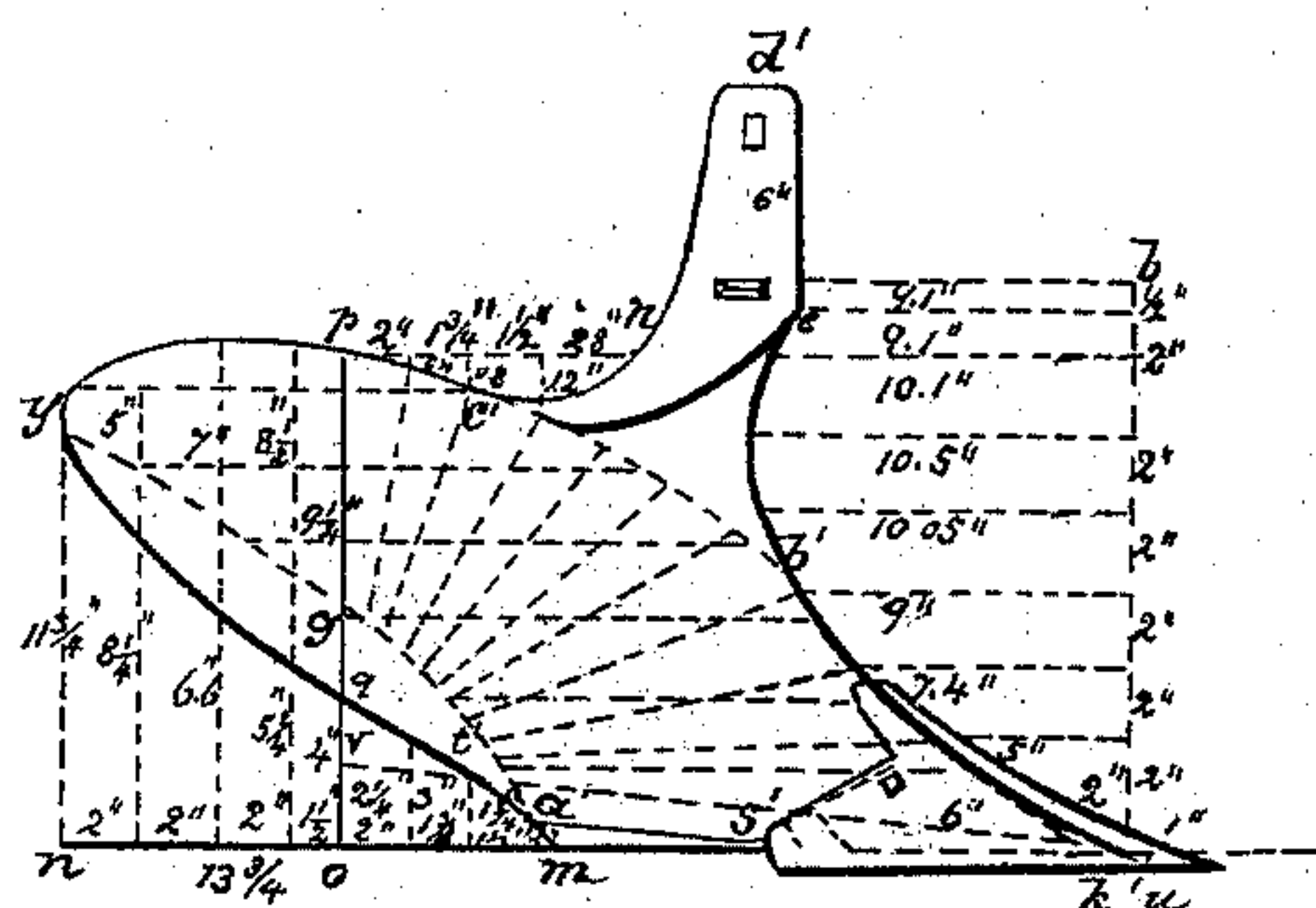


Fig. 8.



UNITED STATES PATENT OFFICE.

AARON SMITH, OF BLOOMFIELD, MICHIGAN.

IMPROVEMENT IN PLOWS.

Specification forming part of Letters Patent No. 3,576, dated May 6, 1844.

To all whom it may concern:

Be it known that I, AARON SMITH, of Bloomfield, in the county of Oakland and State of Michigan, have made certain new and useful Improvements in Plows of Cast-Iron; and I do hereby declare that the following is a full and exact description thereof.

My improvements consist in the manner of attaching the landside and mold-board to each other and in the particular manner in which I form the mold-board.

In the accompanying drawings, Figure 1 represents the inner side of the mold-board, the landside and share being removed for the purpose of showing the wing or head-piece *a*, by which the landside is connected to it. The head-piece or wing *a* is cast in one piece with the mold-board; but it is separate in the pattern for the purpose of molding it with convenience. Fig. 2 is a view of the same parts, looking at the under side of the mold-board and wing or head when cast. The head or wing *a* stands off from the mold-board at the proper angle to receive the landside on its face *a*, Fig. 1, the two parts being held together by a screw-bolt at *b*. A brace-piece at *c* serves to strengthen the wing by connecting it at its upper part with the mold-board. Fig. 3 shows the inner side of the wing or head *a*. Fig. 4 represents the outer face of the landside-plate, and Fig. 5 its inner side. A flange, *d d*, extends the whole length of its lower edge, projecting out on each side. A notch, *e*, is cast in the lower edge of the wing *a*, into which a corresponding projecting piece, *f*, cast on the inner side of the landside, fits. There is also a flange or projecting fillet at *g*, on the inner side of the landside, and as the wing *a* fits in between the flanges *d* and *g*, these, with the screw-nut *b* and the piece *f*, hold the two parts together with great firmness. Fig. 6 is a view of the sole of the share, which is to be attached to the mold-board by means of a screw-nut and a lip, *h*, as in some other plows. When the share is in place its edge *i* embraces the fore end of the landside. Fig. 7 is a plan of my plow as I draw it on my working-board when preparing to make a pattern. The numbers on the line *j j*, representing the landside, show the distances between the principal points of the varying outline of the mold-board, as marked by the dotted lines drawn

at right angles to the landside and terminating in those principal points. The distances from the face of the landside to those principal points are marked on these dotted lines. Fig. 8 is a right-hand or face view of the mold-board with the share attached, showing the outline of its respective sides. The line *k l* is erected perpendicularly from the point of the mold-board. The measurements on the dotted lines drawn horizontally from the perpendicular give the outline of the head of the board, said measurements being taken at the respective distances marked on the perpendicular. The line *m m* is drawn in the plane of the base of the mold-board, and the numbers on the perpendicular drawn from this line give the outline of the lower side of the end of the board and also of the top of it as far as the line *o p*, and the measurements from the line *p r*, drawn through the point *p* parallel to the plane of the base of the board, give its remaining outline to the sheath.

The line *u b' c' p* is a guide-line in forming the face of the board. The manner of forming the curve *u b'* has been already given. That of *b' c' p* may be determined by the scale of one and a half inch to the foot, which is that to which the respective figures are drawn. The manner in which the line *u b' c' p* becomes a guide-line in forming the face of the board will presently be shown.

The line *o p* is a perpendicular, standing at the point where the furrow is on its edge in a perpendicular position. The face of the mold-board at this point is exactly perpendicular, and the line *o p* from *g* to *p* is in it. *q p* is also one of the guide-lines in forming the face of the board.

By Fig. 7 it will be seen that the width from the line of the lower side of the end of the mold-board is eighteen and one-half inches; at the point *o* of the perpendicular, eleven inches; at the heel *s* of the feather of the share, eight inches; at the heel of the mold-board, nine and one-half inches, and the same at the point *t*, this point corresponding to the point *t'* in Fig. 8. The rise of the line of the board to *t'* is made at such rate, compared with the spread of the board, as will exactly preserve through that distance the same width of the plow as at the heel. From *t'* to the perpendicular the rise is such that the increased width of the

plow, Fig. 7, is to the distance as one and one-half to three and three-fourths inches, and from the perpendicular to the end of the board the like measurements are as six and three-fourths to seven and one-half inches. This rise and spread of this part of the board is just that which is required to keep up the lower part of the furrow-slice with the least crowding action against it until the whole is raised to a perpendicular and borne over. The point t' being where the action on the furrow-slice following that of the heel commences, I make that a point through which to draw a line from the point of the mole-board u to the perpendicular. This line also lies in the surface of the board, and is a guide-line. The lines vp and vu both being in the surface of the board—the one where the furrow-slice is nearly horizontal and the other where it is perpendicular—the point v , Fig. 8, I take as a radiating-point, and from it I draw a series of lines which are to touch the curve $ub'c'p$. A straight-edge is to lie in each of these radiating lines so as to fit the actual mold-board. The same figure also exhibits another series of lines which lie in the surface of the board. These are parallel to the forward part of the base us of the board and touch the curve $ub'c'p$ and the perpendicular op . They possess the same character with the radiating lines of being fitted by a straight-edge. The angle formed by the base of the landside and the line us is one of about thirty-seven and a half degrees.

There are other lines in the figure between the perpendicular and the end of the mold-board; but these touch it only at its upper edge, as between these points the board overhangs. In other words, the plane perpendicular to the base which touches its upper edge cuts the line ow , Fig. 9, and the plane that touches its surface from the top to the line yz cuts the line ox , the declension of the latter being at its base just two inches at the end of the board. From the dotted line $yz a'$ to the edge of the board $yq a'$ its face is chamfered off at the rate of one-fourth inch to an inch, the widest part being about two inches.

The triangular space $a'sm$, Fig. 8, represents a part of the board which is cut off so as to form a perpendicular face of from an inch to an inch and a half at its rearend, at ma' , and lessening in width as it approaches the share at s . This is shown also by the line ms , Fig. 7. I have found that this form gives a smooth rise to the furrow-slice. When this part of the mold-board is not removed it is subject to severe wear from the excessive friction against it. The resistance from this cause I obviate entirely, and thereby increase also the durability of the board.

The points which I have aimed at in this form of the board have been to raise the furrow-slice in the easiest manner from left to right and to turn it exactly over its right-hand edge. The horizontal lines in the draw-

ings represent the rise of the furrow-slice, and the radiating lines the manner of its turning as it rises until it falls over after passing the perpendicular op . I have arrived at this form of the mold-board and the relative dimensions of the respective parts after a long series of trials, and have therefore adopted it as the basis upon which I proceed, whether the plow be of the size designated or differing therefrom in its dimensions.

Having thus fully described the nature of my improvements in the plow, what I claim therein as new, and desire to secure by Letters Patent, is—

The particular manner in which I form the face of my mold-board, as herein set forth—that is to say, by taking a radiating-point in the particular position designated in the drawings by the letter v in the perpendicular line op , and at a height above the plane of the sole of the plow such as is herein designated, and from v as a center so forming all the radiating lines between the point u and the upper end of the perpendicular p as that a straight edge shall touch the face throughout the said range, the lines between the perpendicular and the end of the board being straight and inclined over, as described, and the lines of the face of the mold-board parallel to its base also being straight, as set forth.

I am fully aware that mold-boards have been made with the lines straight which are parallel to its base, but not parallel, as I believe, to the edge us of the board; and I am also aware that lines radiating from an assumed point have been applied to the forming of the face of a mold-board, such lines having been straight, or of such a curvature as may have been preferred by the maker; but such assumed radiating-point has been below the base-line of the mold-board, and has consequently failed in effecting the purpose intended. I do not therefore claim anything new in the principle; but I do claim to have devised a mode of carrying out the principle upon which my mold-board is formed, so as to have constructed an instrument more perfect in its action than any hitherto made. And I will here observe that while I have given such precise measurements and proportions as I have found and verily believe to be the best in practice, they may be deviated from to a slight extent without essentially changing the construction of the improved plow. The radiating and parallel lines, for example, may be slightly curved, instead of being straight. The particular outline may also be in some degree changed, while the whole structure would remain substantially as described, and my right be as readily violated as though such colorable changes had not been made.

AARON SMITH.

Witnesses:

GEO. H. SATTERLEE,
JAS. CROW.