

E. BALL, Jr.

Improvement in Apparatus for Forming Plow Shares.

No. 123,805.

Patented Feb. 20; 1872.

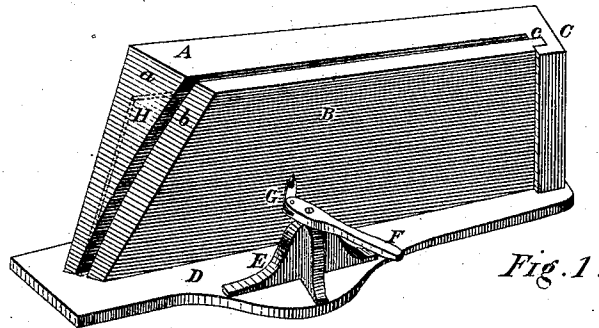


Fig. 1.

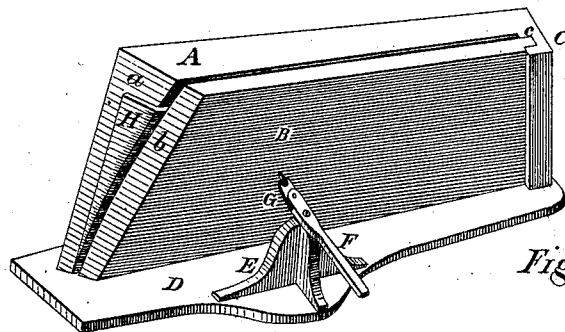


Fig. 2.

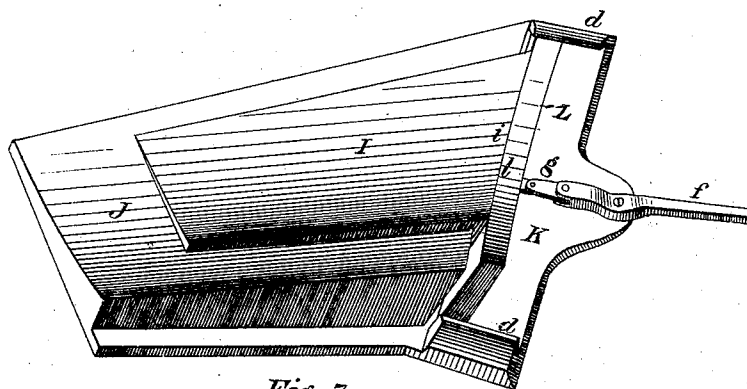


Fig. 3.

Jennie M. Grant }  
Andrew Choffin. } Witnesses

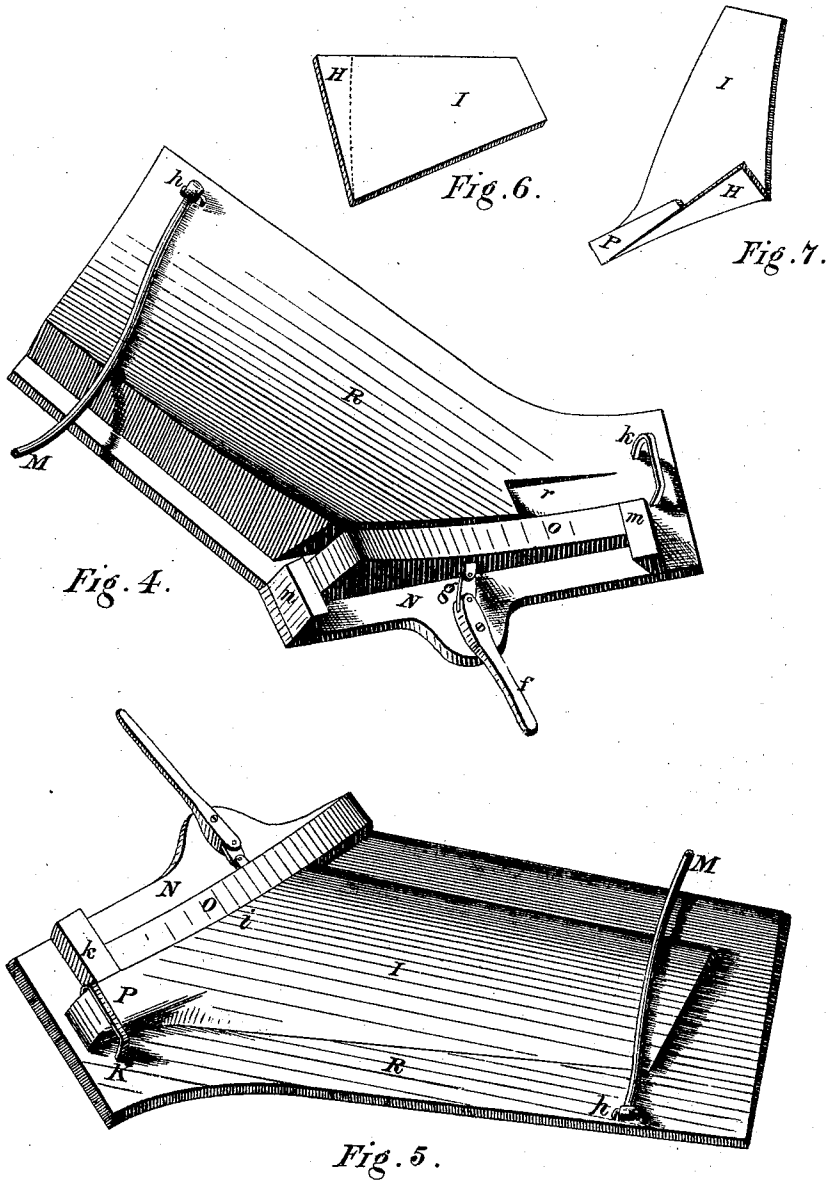
Ephraim Ball Jr., Inventor  
by Jos. Abbott, Attorney

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# UNITED STATES PATENT OFFICE.

EPHRAIM BALL, JR., OF CANTON, OHIO, ASSIGNOR TO HIMSELF AND JOHN BALL & CO., OF SAME PLACE.

## IMPROVEMENT IN APPARATUS FOR FORMING PLOWSHARES.

Specification forming part of Letters Patent No. 123,805, dated February 20, 1872.

### SPECIFICATION.

*To all whom it may concern:*

Be it known that I, EPHRAIM BALL, Jr., of Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Apparatus for Forming Steel Plowshares; and that the following is a full, clear, and exact specification thereof, which will enable others skilled in the art to make and use the said invention.

My invention relates to the means employed for forming a steel share for plows from the plate-steel after the same has been cut out in the proper form; the object of my improvement being to bring the metal into the peculiar form required in a rapid and successful manner, and to produce wrought-steel shares which shall be so nearly fac-similes of each other as to fit correctly on any one of the class of plows for which they are adapted. To this end, it consists, first, in the combination of two shaping-dies having angular beveled end faces, by means of which the plate is first curved to the peculiar form required, and is then held while the landside lip of the share is bent over on the proper line; second, in the combination of an anvil-die and curved anvil-jaw, by means of which the share-piece having the landside lip turned thereon is held in proper position to allow of a sharply-defined edge being forged on the connecting corner of the share-body and landside lip; and, third, in the combination of a forming-die and clamping-jaw, either with or without a point-holder and share-presser, by means of which the share is brought to the precise form required after the point has been welded to the share-plate; the movable shaping-die and the anvil and clamping-jaws in the above-specified combinations being operated by suitable mechanism for moving and holding them in position, as is hereinafter more fully shown.

In the accompanying drawing, Figures 1 and 2 are views of the shaping-dies. Fig. 3 is a view of the anvil die and jaw; and Figs. 4 and 5 are views of the forming-die and attachments as adapted to my method of forming the share. Fig. 6 is a plan of the share-plate before being formed; and Fig. 7 is a view of the under side of the finished share.

The shaping-die A is secured on a base, D,

and has a flange, C, formed at its rear end, in which is formed a groove, *c*. The other shaping-die B has a beaded end which fits in the groove *c*, thus allowing of a movement of the die B around its beaded end as an axis, similar to the turning of a door on its hinges. The end faces *a b* of the dies A B are beveled off at such an angle as to secure the bending of the landside lip H of the share on the proper line, when the share-plate is placed between the dies with its lower edge resting on the base D, and the adjacent faces of the dies A B are made to conform to the required shape of the share. In order to bring a quick and powerful pressure on the heated share-plate when placed between the dies, and to hold it firmly while the landside lip is being bent over, the standard E is secured on the base D, and a lever, F, is pivoted on its upper end, and a short toggle-lever, G, is attached to the inner end of the lever F and to an eye or staple on the die B, thus forming a toggle-joint between the standard E and die B, as shown in Figs. 1 and 2. The anvil-die J is secured on a base, K, and has its upper face made to conform to the inner or lower face of the share. The guides *dd* are secured on the base K, and between them is arranged the sliding anvil-jaw L, which is operated by the toggle-levers *f g*, secured to the base K and jaw L, in a manner readily understood. The upper face *l* of the jaw L is made in the form of the curve required for the edge of the share, and is at such height above the face of the die J as to be just on the proper line for the share-edge, when the share-plate is placed on the die. The forming-die R is secured on the base N, and has its upper face made of the precise form required for the inner face of the finished share, and at its lower corner is formed a cavity, *r*, in which fits the rear end of the point P, which is welded into the share-plate after it is taken from the anvil-die J. The clamping-jaw O is arranged to work between the guides *m n* on the base N, and is operated by the toggle-levers *f g*, secured to it and to the base N, as shown, said jaw O being of such height as to press the whole or the greater part of the landside lip of the share against the adjacent and vertical face of the die R, which is of the form required for the inner face of the lip of the finished share.

The point-holder *k* is secured in the base *N*, and serves to hold the share-point, which is slid into it when the share is placed on the die *R*; and a presser, *M*, of a form adapted to fit down on the face of the share, is attached by a staple, *h*, to the die *R*, as shown.

The method of forming the steel share by the aid of the before-described appliances is substantially as follows: The plate-steel is first cut out in the form indicated in Fig. 6, where the dotted line between the parts *H* and *I* indicates the approximate position of the front edge of the finished share. It is then heated and placed between the dies *A B*, as shown by dotted lines in Fig. 1, where, by a quick movement of the lever *F*, it is curved to the proper form for the share, and is firmly held while the operator, with a hammer, bends over the lip *H* onto the face *a*, as shown in Fig. 2. The share has now about the proper curvature, and the bevel of the lip *H* has been commenced on the proper line, but it requires to be bent over further than it could be safely bent on the die *A* without danger of cracking at the corner, and the corner requires forging out to a sharp angle, instead of being simply rounded, as it is, by the operation of bending the lip on the die *A*. The share is, therefore, again heated, (unless it retains sufficient heat to admit of being forged on coming from the die *A B*, which is not usually the case,) and is placed on the anvil-die *J*, and the jaw *L* is brought up by means of the toggle-levers *f g*, so as to clamp the lip *H* firmly between the end face of the die *J* and the jaw *L*, when, by hammering on the plate *I*, the operator brings it down onto the die *J*, and then forges up the sharp edge *i*, by hammering the metal toward the jaw *J*, in a manner readily seen, it being understood that sufficient metal is turned over for the lip *H* to allow of this drawing up of the plate *I*, in connection with the thickening up of the upper edge of the lip *H*, to form the full sharp corner *i*. The share-plate is then taken from the die *J*, and the point *P*, shown in Figs. 5 and 7, is welded in, when the share is complete, except that it has still to be brought to the precise form required to adapt it to its seat on the plow. For this purpose it is placed on the forming-die *R*, with its point under the holder *k*, and the jaw *O* is brought up by the toggle-levers *f g* against the landside lip *H*, when the operator, by holding down the outer end of the share by means of the presser *M*, and hammering on the share, can bring it down to a close fit with the die *R* on all parts.

It is obvious that the operator could, by clamping the lip *H* firmly and bearing on points of the share with a rod or bar, manage to fit the share down to the die *R*, even if the point-holder *k* and presser *M* were dispensed with; but these appliances add greatly to the ease of fitting down the share to the die *R*. It is also evident that other devices, such as screws, cams, or wedges, could be used in place of the toggle-levers *F G* or *f g*; but I prefer the toggle-levers for this purpose, because of their cheap and simple construction and quick and powerful action.

What I claim herein as new and as my invention is—

1. The combination of the shaping-dies *A B*, having angular beveled end faces *a b*, and suitable mechanism for moving and holding the movable die *B*, the adjacent faces of said dies being of the form required for the share, and the combination serving to "shape" the share-plate *H I* and to hold it in "shape" while the landside lip *H* is being bent over along the proper line, substantially as specified.

2. The combination of the anvil-die *J*, anvil-jaw *L*, and suitable mechanism for moving and holding said anvil-jaw, said jaw being "shaped" and projecting above the upper face of the die, and the combination serving to hold the share-plate *H I* while the sharp edge *i* is being forged thereon, substantially as specified.

3. The combination of the forming-die *R* with point-cavity *r*, clamping-jaw *O*, and suitable mechanism for moving and holding said clamping-jaw, said combination serving as a means of securing the proper finished form of share, substantially as specified.

4. The point-holder *k* and hinged share-presser *M*, in combination with the forming-die *R*, provided with point-cavity *r*, the clamping-jaw *O*, and mechanism for moving and holding said jaw, substantially as specified.

5. The herein-described method of forming a wrought-steel share by first "shaping" the share-plate, then turning the landside lip, then forging the sharp front edge, then welding in the point, and finally hammering the whole share down to the correct shape, all by the aid of dies and jaws constructed substantially as specified.

As evidence of the foregoing, witness my hand this 30th day of December, A. D. 1871.

EPHRAIM BALL, Jr.

Witnesses:

JENNIE M. GRANT,  
JOB ABBOTT.