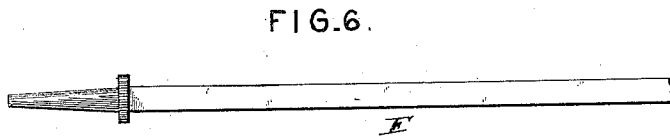
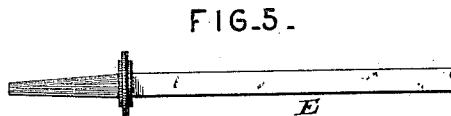
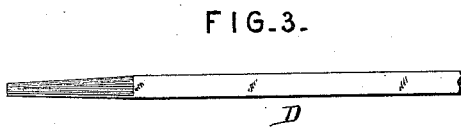
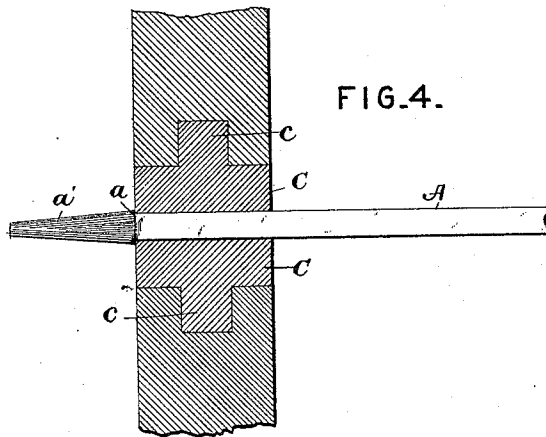
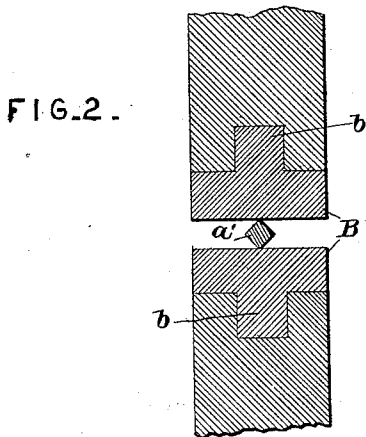
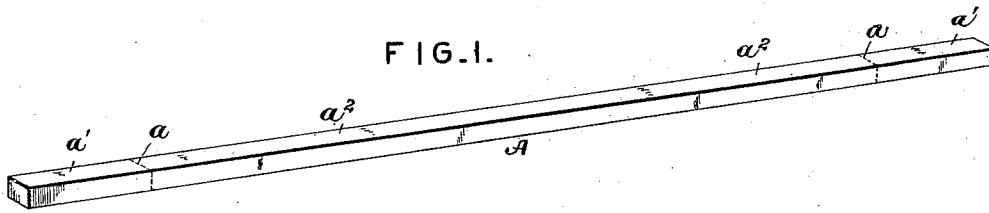


(No Model.)

W. J. PARMELEE.
MANUFACTURE OF AXLES.

No. 472,389.

Patented Apr. 5, 1892.



Witnesses

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L. P. McLaughlin

By his Attorneys,

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UNITED STATES PATENT OFFICE.

WOLCOTT J. PARMELEE, OF WILKES-BARRÉ, PENNSYLVANIA.

MANUFACTURE OF AXLES.

SPECIFICATION forming part of Letters Patent No. 472,389, dated April 5, 1892.

Application filed August 7, 1891. Serial No. 402,010. (No model.)

To all whom it may concern:

Be it known that I, WOLCOTT J. PARMELEE, a citizen of the United States, residing at Wilkes-Barré, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Process for the Manufacture of Axles, of which the following is a specification.

My invention relates to an improved process of manufacturing and finishing die-forged axles; and it has for its object to manufacture an axle out of a single blank of metal which, after having passed through the various steps for forming the same into the requisite shape, will be smooth, finely finished, and free from the scales which necessarily are formed upon iron or steel which has been heated to a forging heat, and thus permits the completed axle to be painted and varnished without having to file or grind the same, as is customary; and with these objects in view the invention consists of the detailed process hereinafter fully described, illustrated, and claimed.

In the accompanying drawings, Figure 1 is a detail in perspective of the blank or stock from which the axle is formed. Fig. 2 is an elevation of the dies of a hammer or drop with the spindle end of the stock diagonally inserted therein. Fig. 3 is a detail view of one end of the axle, showing the spindle-arm rolled thereon. Fig. 4 is an elevation of the dies of a hammer or drop with the portion of the stock back of the spindle-arm inserted between the same. Fig. 5 is a detail view of one end of the axle with the collar and flash formed thereon. Fig. 6 is a detail view of one end of the completed axle.

Referring to the accompanying drawings, A represents a blank or stock of metal of any suitable shape, which in the present instance is shown rectangular and which is cut in a suitable length to form the ordinary length of axle. The ends of said stock or block are first heated to a forging heat, and in this condition said ends are submitted from the point *a* from which the spindle or arm *a'* is to be formed to reverse edgewise pressures between the dies B B of the ordinary hammer or drop, and which are provided with the tenons *b*, by means of which said dies are removably secured in the bed and plunger of the drop in the ordinary manner. This compression of the opposite edges or corners of the

blank causes the corners to spread and thereby swell the arm, which swell compensates for the reducing of the arm of the stock when the spindle is being rolled and leaves the blank the requisite length. The action of the spindle-forming dies in rolling the spindle causes flat places to be formed on the said spindle or arm by the drawing out of the metal. By forming a swell on the spindle just at the point where the rolling thereof "draws out" the metal this objection is entirely overcome. Without reheating the blank after hammering and swelling the arm of the stock, which leaves the same in a smooth condition, the said arm or spindle end is submitted to pressure between the spindle-forming rollers and dies patented by me January 6, 1891, and numbered 444,253, after which process the end of the stock or blank is in the required rounded and finished condition and the whole axle is left in the desired length. (See Fig. 3.) Having subjected the end of the blank to the action of the spindle-forming dies, the portion of the same directly back of the inner end of the spindle at *a'* is subjected to pressure between the dies C C of the ordinary hammer or drop, and which are provided with the tenons *c*, by which the said dies are also removably secured to the bed and plunger of the drop in the ordinary manner. The axle is submitted to the blows of the hammer on all its square faces, which causes the scales which have been necessarily raised thereon by the forging heat to be removed and leaves the same in a clean, fine, and smooth condition ready for the finishing-shop. This operation is facilitated and perfected by having a stream of water playing on the dies and the axle-blank while the same is undergoing the finishing stage under the action of the dies of the hammer or drop. The axle now presents the appearance as shown at D in Fig. 3 of the drawings. After having finished and cleaned the axle-bed back of the spindle or arm just described the same is placed within the dies of the collar-forming apparatus for which I have obtained Letters Patent No. 430,541, and issued June 17, 1889, which apparatus leaves the axle with a collar having a flash or fin thereon, as illustrated in Fig. 5 of the drawings, as at E. This flash or fin is subsequently removed by any suitable device, preferably

by the apparatus for which I have obtained Letters Patent No. 434,068, and issued August 12, 1890, leaving the completed axle F.

The herein-described process is now thought to be apparent without further description. The portion of the axle-blank back of the spindle end may be removed of its scales by the successive blows of the hammer after the collar is upset thereon; but this is not desirable, inasmuch as the upsetting-dies will have a tendency to force what scales there may be into the axle-bed at the point at which the same is subjected to the action of the hammer or drop and naturally will not leave it in as smooth a condition or as uniform in length between the collars as by having the upsetting of the axle occur subsequent to removing the scales therefrom; but, as said, the reverse step may be used, and it may also be noticed at this point that the various steps of the process are carried through with but one heating of the axle-blank; but this may also be varied by a slight reheating of the axle, if it becomes necessary.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In the manufacture of axles, the subjecting of the spindle end of the axle-blank, while heated, to a forging heat and to reverse edgewise pressures between dies that swell the same previously to rolling the spindle end, thereby compensating for the action of the rolls in the subsequent operation, substantially as set forth.

2. In the manufacture of axles, the herein-described process, consisting in subjecting the spindle end of the axle, while heated, to a forging heat, to reverse edgewise pressures between dies that swell the blank at places,

rolling the spindle end, and subjecting the square faces of the blank back of the spindle or arm to successive blows between the dies of a hammer or drop, substantially as set forth.

3. The herein-described process for the manufacture of axles, the same consisting in subjecting the spindle end of the axle, while heated, to a forging heat, to reverse edgewise pressures between dies that swell the same, then rolling the spindle end, then subjecting the square faces of the blank back of the spindle or arm to successive blows between the dies of a hammer or drop, and jetting continuous streams of water upon both the dies and the axle-blank while undergoing this step, forming a flash-collar thereon, and finally removing the flash from the collar, all the operations being performed at the same original heat, substantially as set forth.

4. In the manufacture of axles, the method of freeing the axle-blank from scales, consisting in subjecting the blank adjacent to and at the point where the collar is to be formed to repeated blows from a hammer or drop, substantially as set forth.

5. In the manufacture of axles, the method of compensating for the action of the rolls in forming the spindle, consisting in subjecting the axle-blank before the spindle is rolled to the action of dies to cause the blank to swell at the point where the drawing action of the rolls has a tendency to leave flat places in the blank, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

W. J. PARMELEE.

Witnesses:

F. W. PARMELEE,
CARL C. SEVISON.