(No Model.) 2 Sheets—Sheet 1.

W. J. PARMELEE.

PROCESS OF AND APPARATUS FOR MAKING AXLES.

No. 454,685. Patented June 23, 1891.

FIG. 1.

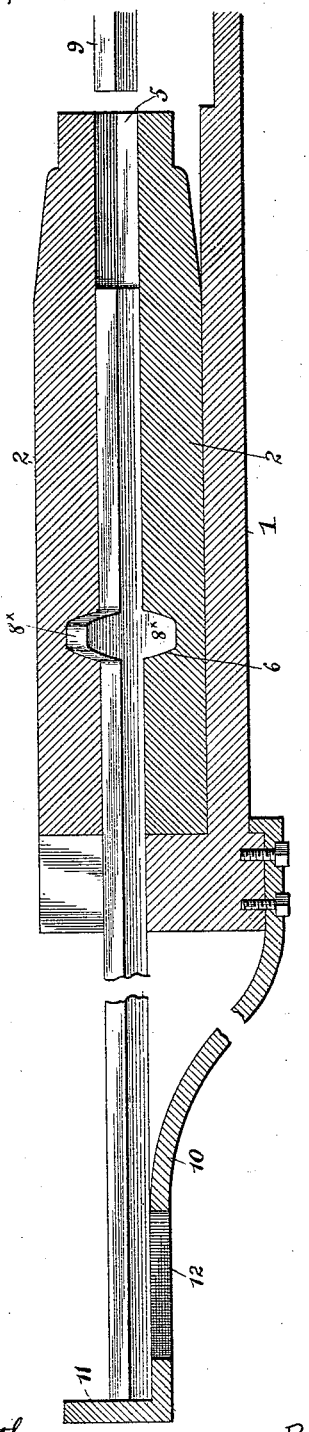


FIG. 2.

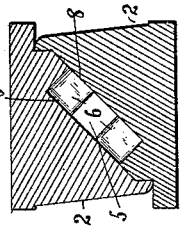
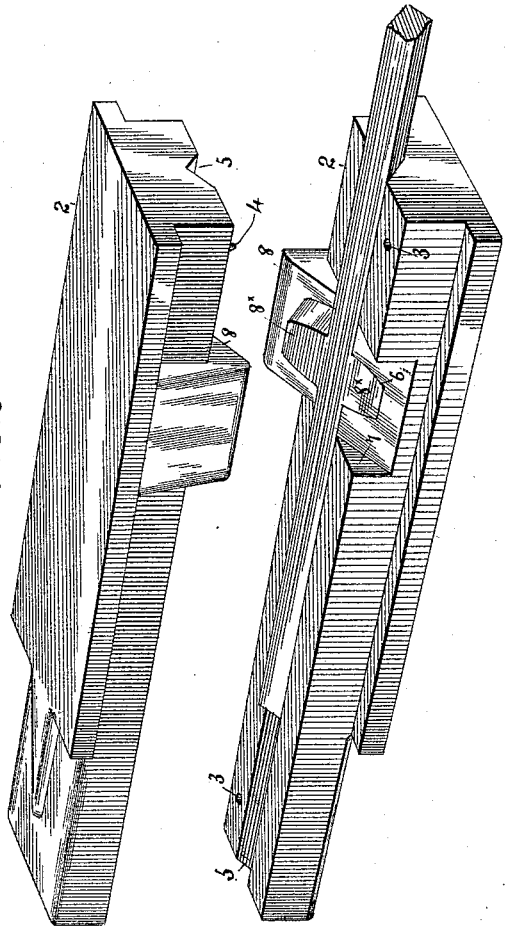


FIG. 3.



Witnesses

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(No Model.) 2 Sheets—Sheet 2.

W. J. PARMELEE.

PROCESS OF AND APPARATUS FOR MAKING AXLES.

No. 454,685. Patented June 23, 1891.

FIG-6-

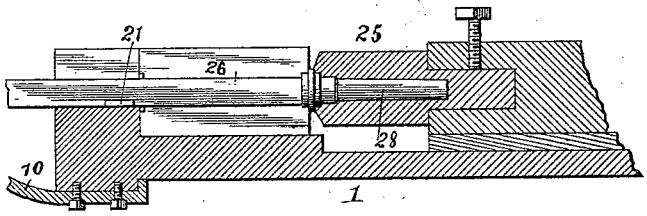


FIG-4-

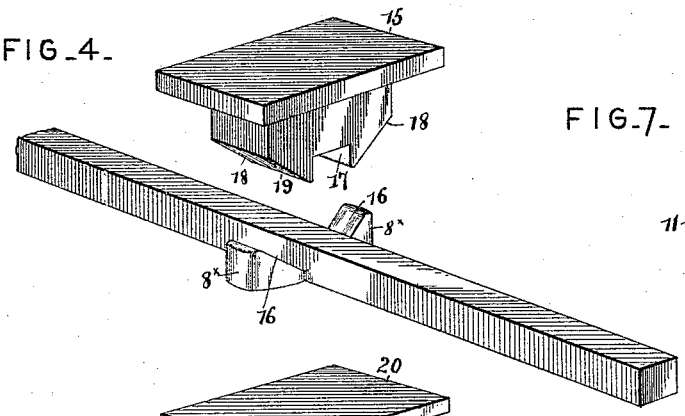
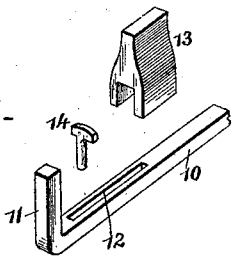


FIG-7-



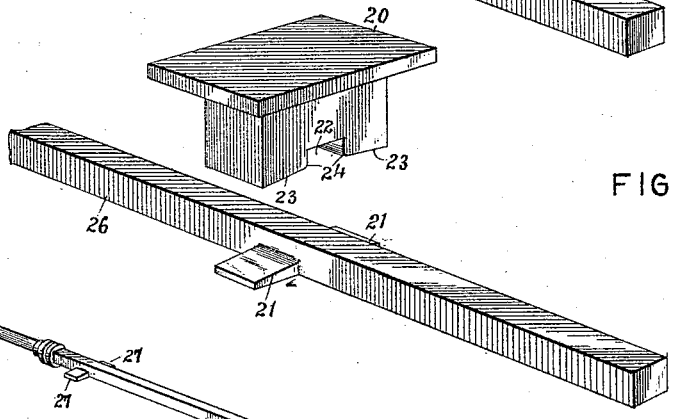


FIG-5-

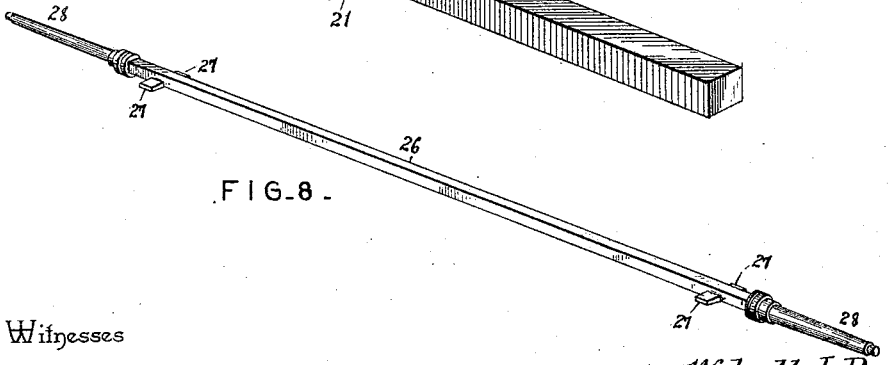


FIG-8-

Witnesses

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UNITED STATES PATENT OFFICE.

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

PROCESS OF AND APPARATUS FOR MAKING AXLES.

SPECIFICATION forming part of Letters Patent No. 454,685, dated June 23, 1891.

Application filed April 22, 1891. Serial No. 390,002. (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 of and Apparatus for Making Axles, of which the following is a specification.

My invention relates to an improvement in processes of and apparatus for forging axles; and it has for its object to provide for the simple and easy manufacture of vehicle-axles from a single blank of metal, providing the same with both spindles and integral "flaps," which form the rest for the springs of the ordinary "platform spring-wagons," being designed to take the place of the wooden flaps used on axles; and it consists of a flap-axle and a simple method of and apparatus for forming said flaps from a blank bar of metal used in conjunction with the process of and apparatus for forging the spindles and axle-collars patented by me June 17, 1890, No. 430,541, all of which is hereinafter fully described, illustrated in the accompanying drawings, and specifically pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of a portion of a machine provided with my dies for forming the flaps, and the axle-blank being inserted between the dies and the follower or plunger about entering the end of the same. Fig. 2 is a cross-section of the flap-forming dies closed. Fig. 3 is a detail in perspective of one of the die-sections with a portion of an upset axle therein. Fig. 4 is a detail in perspective of the fullering-die and fullered axle. Fig. 5 is a similar view of the flap-finishing die and a portion of the axle with a completed flap. Fig. 6 is a longitudinal sectional view of a portion of a machine provided with my patented spindle and collar-forming apparatus with a flapped axle between the dies. Fig. 7 is a detail in perspective of the outer end of the supporting-bracket and adjustable stops. Fig. 8 is a detail view of the completed axle.

Referring to the accompanying drawings by numerals, 1 designates the bed of a suitable machine, upon which is placed my improved flap-forming dies 2 2, provided on their meeting faces with interlocking pins and holes 3 and 4. Dies 2 are further provided with angular grooves 5, which when placed together form a squared opening through which the axle-blank is designed to be placed. A semi-rounded and angular recess 6 is formed in one of the faces of said angular grooves within each die-section, directly over which recess and in the same plane therewith the dies are also provided with a cut-out portion 7. In the same line with said cut-out portion and groove, but extending up from the opposite face of the angle-groove, is a beveled elevation 8, that is adapted to take into the cut-out portion of the opposing die when the two die-sections are placed together, thus forming a central squared axle-opening and recesses to either side, into which the axle-blank is designed to be upset and form the flaps $8^{\times}$, referred to.

The axle-blank having been placed within the aforesaid flap-die, which is kept closed in the ordinary manner, the follower or plunger 9, operated by suitable mechanism, enters one end of said die and upsets the metal previously heated into the flap-forming recesses, as is shown. The axle-blank is supported upon the bracket-arm 10, that extends out from beneath the bed of the forging-machine 1, and is provided at its end with an upturned stop 11, against which abuts the free end of the axle-blank. A slot 12 is also formed in the end of said bracket-arm that is adapted to receive the adjustable stops 13 and 14, which are designed to accommodate the loss of length of the axle-blank in the upsetting of the same. The blank on coming from the flap-dies is put into a press or drop and subjected to the action of the fullering-die 15, that fullers the flap on each side, as shown at 16, a sufficient depth to secure the correct width of the flap. The fullering-die 15 is provided with a squared recess 17, of a width to take over the square axle-blank, and with receding beveled sides 18, that form an edge 19 with the walls of said squared recess, said edge being adapted to bear into the flaps $8^{\times}$, that are of the width of the axle-blank after coming from the dies, and fuller the same, as already described. After removing the blank from the fullering-die the same is placed in the hammer or drop and subjected to the fin-

ishing-die 20, that reduces the flap to its finished shape, as shown at 21. Die 20 is also provided with a squared recess 22, that is designed to take over the square axle-blank and press the material into its proper shape. The meeting faces of the finishing-die are slightly beveled at 23, but inwardly toward the central squared recess, the ends of the walls of the same having smooth rounded corners 24, that together with said beveled faces finish the flaps symmetrically and smooth and in the shape in which they are ordinarily constructed. The flaps being now completed, the bar is placed in dies in a hammer or drop and all surplus is trimmed from the same, and is left in any shape desired. The ends of the blank are now rolled into a cylindrical shape, and the same is finally placed within the collar-and-spindle-forming apparatus 25, previously referred to, and in which the collar is formed between a die and die-plunger, with a central "flash" between the outer and inner shoulders of the same, which flash when removed completes the axle, the bar of metal being supported and held within the dies by the bracket-arm and stops used in conjunction with the flap-dies also. A reversion of this process could be practiced, though not preferred, in which the collar and spindles were formed first and the flaps subsequently.

Both ends of the axle are treated in identically the same manner, and when completed form an axle 26, constructed of a single piece of metal and provided with the integral flaps 27 and collars and spindles 28.

The operation of my process and apparatus is thought to be clear from the foregoing description.

The axle-blank, having been heated to a forging heat at one end, is adjusted between two long die-sections, the cold end being suitably supported and secured against endwise displacement. A plunger or follower entering one end of said die, the metal is upset into flap-forming cavities within said die and completes the first stage of the operation. The blank, with the flap of the same thickness as the bar itself, is then removed to a press or drop and through dies fullered on each side to reduce the thickness of the flap directly on either side of the axle to the requisite width, and preparatory to placing the blank in this condition again in a hammer and drop provided with a finishing-die that presses out all surplus metal and adapts the flap to its shape, completing the forging of the same and leaving it in the desired shape. The axle-blank, with the completed flap, is now trimmed of all superfluous metal and left in any shape desired by submitting it to the action of suitable dies in the hammer or drop, after which the ends of the same are rolled to a cylindrical shape and finally upset in dies to form the spindles and axle-collars, as before set forth. This axle may also be forged in parts to the shapes described and afterward welded together without departing from the spirit of my invention.

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

1. In the manufacture of axles, the process of forming the flap on the axle, consisting in subjecting the axle-blank, which has been heated to a suitable degree, to endwise pressure between the die-sections that form on the axle the lateral wings called the "flap," substantially as set forth.

2. In the manufacture of axles, the process of forming the flap on the axle, consisting in subjecting the axle-blank, which has been heated to a suitable degree, to endwise pressure between die-sections that form the lateral projections constituting the flap, and then placing the same in a press or drop and fullering at each side of the bar, substantially as set forth.

3. In the manufacture of axles, the process of forming the flap on axle, consisting in subjecting the axle-blank, which has been heated to a suitable degree, to endwise pressure between die-sections that form the lateral projections constituting the flap, then placing the same in a press or drop and fullering at each side of the bar, and finally placing in a hammer or drop and subjecting it to the action of finishing-dies, substantially as set forth.

4. In the manufacture of axles, the process of forming an axle provided with collars and flaps from a single blank, consisting in placing the axle-blank, which has been heated to a suitable degree, between die-sections that form the lateral wings constituting the flap, and subjecting the same to endwise pressure by the action of a follower or plunger entering one end of the dies and upsetting the metal, then placing in a press or drop and fullered at each side by the action of fullering-dies, then subjecting to the action of the flap-finishing dies in a hammer or drop, then trimming all surplus metal and put in the desired shape by being placed in trimming and shaping dies in hammer or drop, and in finally rolling at the end between rolling-dies and upsetting to form the collar of the axle, substantially as set forth.

5. In an apparatus for forming the flaps on axles, a follower or plunger and die-sections provided in their meeting faces with angular grooves, and flap-forming recesses formed in one of the faces of said angular grooves, substantially as set forth.

6. In an apparatus for forming the flaps on axles, a follower or plunger and die-sections provided with angular grooves on their meeting faces, semi-round or angular cavities or recesses formed in one of the faces of said angular grooves, cut-out portions directly over said recesses and in the same side of the die-section, and beveled projections extending up from the face of the angle-grooves op-

posite said recesses and on the opposite side of said die-sections, being adapted to take into the cut-out portion of the opposing die-section and inclose the open side of said cavity forming flap-forming chambers on opposite sides of the die, substantially as set forth.

7. In an apparatus for forming the flaps on axles, die-sections provided on their meeting faces with angular grooves, and flap-forming recesses formed in one of the faces of said angular grooves, a follower or plunger adapted to enter one end of said die, and a fullering-die provided with a central squared recess and beveled sides receding from the open ends of said recess, substantially as set forth.

8. In an apparatus for forming the flaps on axles, die-sections provided on their meeting faces with angular grooves, and flap-forming recesses formed in one of the faces of said angular grooves, a follower or plunger adapted to enter one end of said die, a fullering-die provided with a central squared recess and beveled sides receding from the open ends of said recess, and a finishing-die provided with a central squared recess and beveled sides inwardly inclined toward the walls of said recess and meeting the same in rounded corners, substantially as set forth.

9. In an apparatus for forming the flaps on axles, a follower or plunger, and die-sections provided with angular grooves on their meeting faces, semi-rounded or angular cavities or recesses formed in one of the faces of said angular grooves, cut-out portions directly over said recesses and in the same side of the die-section, and beveled projections extending up from the face of the angle-grooves opposite said recesses and on the opposite side of said die-sections, being adapted to take into the cut-out portion of the opposing die-section and inclose the open side of said cavity forming flap-forming chambers on opposite sides of the die, a fullering-die provided with a central squared recess and beveled sides receding from the open ends of said recess, and a finishing-die provided with a central squared recess and beveled sides inwardly inclined toward the walls of said recess and meeting the same in rounded corners, substantially as set forth.

10. In an apparatus for making a flap vehicle-axle provided with integral collar and spindle, the combination, with axle-collar and spindle-forming dies, of an axle-blank-supporting bracket with adjustable stops, die-sections provided with angular grooves and recesses forming the flaps on the axle-blank, a follower or plunger adapted to enter one end of said flap-forming dies, and a fullering-die and a flap-finishing die, combined substantially as set forth.

11. As an article of manufacture, a vehicle-axle formed out of a single blank of metal provided with integral flaps, collars, and spindles, substantially as herein described.

12. The fullering-die provided with a central squared recess and beveled sides receding from the open ends of said recess, as set forth.

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

WOLCOTT J. PARMELEE.

Witnesses:
BEN C. PRICE,
JNO. T. MORGAN.