

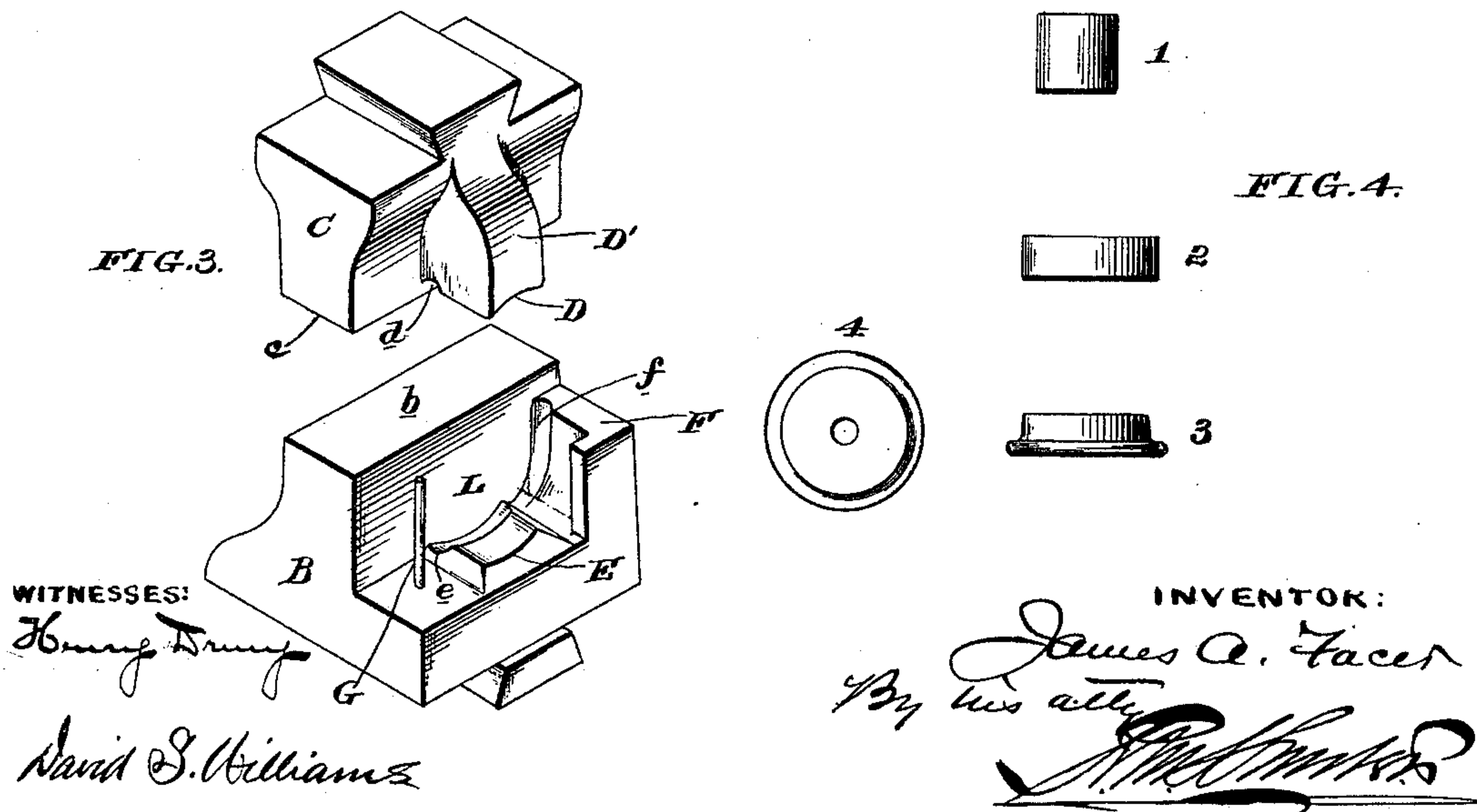
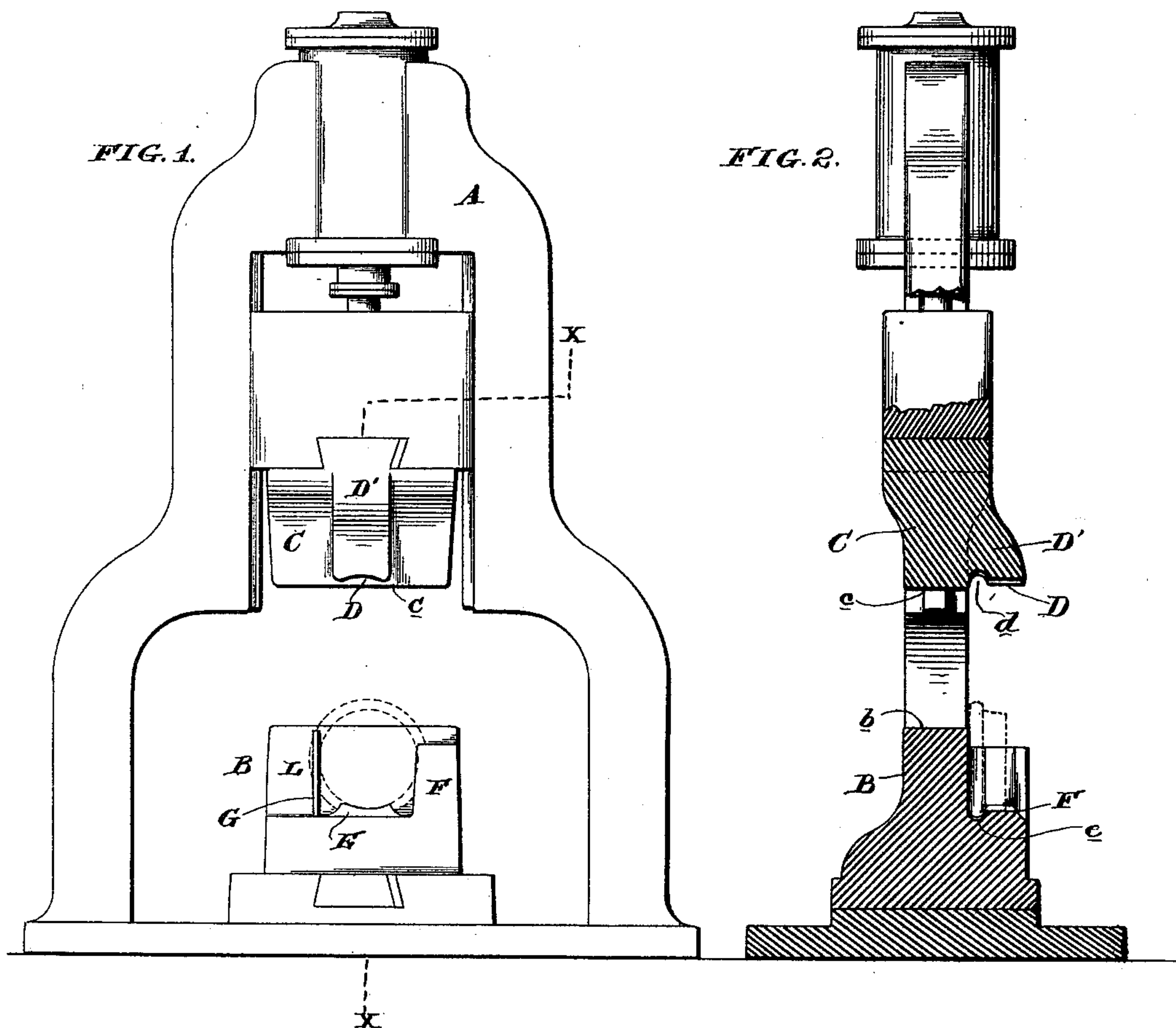
(No Model.)

J. A. FACER.

STEAM HAMMER FOR FORGING STEEL WHEELS.

No. 414,030.

Patented Oct. 29, 1889.



UNITED STATES PATENT OFFICE.

JAMES A. FACER, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-HAMMER FOR FORGING STEEL WHEELS.

SPECIFICATION forming part of Letters Patent No. 414,030, dated October 29, 1889.

Application filed May 8, 1889. Serial No. 310,026. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. FACER, of Philadelphia, Philadelphia county, Pennsylvania, have invented an Improvement in Steam-Hammers for Forging Steel Wheels, of which the following is a specification.

My invention relates to steam-hammers for forging wheels for cars, &c.; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

More particularly my invention relates to certain improvements in the hammer and anvil dies of the steam-hammer for forging the ingot into the requisite shape.

Heretofore it has been customary to manufacture car-wheels by two processes, one of which consists in first casting the wheel of approximately the shape of the finished article and then subjecting the casting to a rolling action in a machine especially adapted to the purpose, and the other of which consists in casting the center of iron or steel and fitting thereto a steel tire, which is forged into shape from a solid bloom by proper manipulation under a steam-hammer and rolls. These processes have many objections, principally in the matter of expense or cost of manufacture, and in the case of the first-mentioned process a lack of homogeneity and solidity in the cast metal of the finished wheel.

The object of my invention is to make a car-wheel formed from a solid ingot-bloom of steel by forging the ingot under heavy steam-hammers having suitably-shaped dies. The car-wheel made in this manner is compact and homogeneous as to metal and possesses a hardened surface, due to the forging process.

In carrying out my invention I first take a heated bloom or steel ingot and place it under a steam-hammer having dies of the proper shape to first flatten out the bloom into a disk of sufficient diameter to form the wheel. When this is done, the disk, still in its heated condition, is set on edge and rounded up, and at the same time the flange or treading part of the wheel is finished in rough. When the bloom is shaped as above indicated, it is placed flat upon the anvil-die and a punch is used to form the axle-holes. The hammer-die in this operation is used to drive the

punch into the metal. This punched bloom or rough wheel may then be forged into the finished wheel by suitable hammer and anvil dies, with which, however, the present invention is not concerned, as they form subject-matter of another application, filed on the 8th day of May, 1889, and serially numbered 310,025.

The present invention is concerned only with the devices for flattening, rounding up, flanging, and punching the bloom in the manner described, whereby all of these operations may be performed on the same hammer and with one heating.

I do not claim in this application the process of manufacturing wheels herein described, as that forms the subject-matter of my application, Serial No. 310,027, filed May 8, 1889.

In the drawings, Figure 1 is a front elevation of a steam-hammer embodying the principles of my invention. Fig. 2 is a sectional side elevation of the same on the line X X of Fig. 1. Fig. 3 is a perspective view of the detached hammer and anvil dies, and Fig. 4 is a general view of the various shapes given to the bloom in the different stages of its construction.

A is the hammer.

B is the anvil-die, having a flat surface *b* and formed with a laterally-projecting base supporting part E, preferably curved, having a groove *e* corresponding to the section of the flange of the wheel. The parts E *e* are arranged at the front part of the body of the anvil-die and at a considerably lower elevation than the upper surface *b*, so that the front vertical surface L will act as a support for the bloom during the flanging operation. This anvil-die is also provided with a lateral support F, having a groove *f* for the flange of the wheel. A pin G is detachably secured to the lower part of the anvil-die and acts as a support for holding the bloom in a vertical position while being trimmed.

C is the hammer-die, which is formed with a flat face *c*, corresponding in size with the surface *b* of the anvil-die, the line of action of the hammer-rod being preferably through the central point of these surfaces *c* and *b*. The hammer-die is provided with a projection D' on its front part, having the under

curved surface D and groove *d* therein corresponding with the curved surface E and groove *e* of the anvil-die. It is apparent that the projection D' may be of any size and
 5 may extend the entire length of the die C. The surface D is raised slightly above the surface *c*, and the surface F is lowered below the surface *b*, so that the surfaces *c* and *b* may be used to good effect in working down the
 10 bloom during the flattening process from the shape No. 1 in Fig. 5 to shape No. 2.

The curvature of the surfaces E and D may be dispensed with, if desired, for, while they have a tendency to center the blank under
 15 the projection D', they cannot correspond to the curvatures of wheels of different diameters.

The surfaces *c* and *b* are preferably made long and narrow, and the parts E and D are
 20 arranged at the middles of the dies, and as closely to the center line of the piston-rod of the hammer as possible, to reduce the leverage as far as possible, and thereby prevent undue strain upon the dies and hammer.

While I prefer the details of construction which are here shown, I do not limit my invention thereto, as it is apparent that they may be varied in many ways without departing in the least from the principles of my in-
 25 vention.

The operation of my improved hammer is as follows: The heated ingot 1 of Fig. 4 is placed upon the surface *k* of the anvil-die and flattened down into the shape 2. It is
 35 apparent that any shape of ingot may be used, though that shown is preferred. This flattened blank 2 is then placed against the face L of the anvil-die and rests upon the surface E and over the groove *e*, as shown in dotted lines
 40 in Fig. 1. The hammer-die C is now brought down, and by the hammering operation and turning of the bloom the flange is formed upon the bloom, bringing it into the shape 3 by reason of the forging operation between
 45 the surfaces E and D *d*, which gives to the edge of the bloom a shape corresponding to the cross-section of those surfaces. The bloom is now placed flat upon the anvil-die surface *b* and a punch driven in by the hammer. The
 50 bloom is then turned over and the punch is driven from the other side to form the axle-hole K. The blank will then be flanged, rounded up, and punched in the condition shown in Fig. 4.

It is apparent that the punching operation may be performed previously to the rounding up and flanging, if desired; or the hole may be subsequently drilled.

Having now described my invention, what I claim as new, and wish to secure by Letters Patent, is—

1. In a steam-hammer for forging wheels, a hammer-die having a projection upon one face thereof, in combination with an anvil-
 55 die provided with a laterally-extending support for the periphery or tread of the wheel-blank to hold said blank in an upright posi-

tion against the side or face of the anvil and permit it to be turned during the rounding-up and flanging operation.

2. In a steam-hammer for forging wheels, a hammer-die having a projection upon one face thereof, in combination with an anvil-die provided with a laterally-extending support for the periphery or tread of the wheel-
 75 blank at the base and face to hold said blank in an upright position against the side or face of the anvil and permit it to be turned during the rounding-up and flanging operation.

3. In a steam-hammer for forging wheels, a hammer-die having a projection upon one face thereof, having a curved under surface, in combination with an anvil-die provided with a laterally-extending support for the periphery or tread of the wheel-blank to hold
 85 said blank in an upright position against the side of the anvil and permit it to be turned during the rounding-up and flanging operation.

4. In a steam-hammer for forging wheels, a hammer-die having a projection upon one face thereof, having a curved and grooved under surface, in combination with an anvil-die provided with a laterally-extending support for the periphery or tread of the wheel-
 95 blank, to hold said blank in an upright position against the side or face of the anvil and permit it to be turned during the rounding-up and flanging operation, provided with a groove for receiving the flange on the periph-
 100 ery of the blank.

5. In a steam-hammer for forging wheels from solid ingot-blooms, the combination of a hammer and an anvil-die having flat surfaces to flatten and drive a punch into the bloom, a projection upon said hammer-die, and laterally-projecting supports upon the base of the anvil-die to support the flattened blank in an upright position against the face of the anvil-die for the purpose of rounding it up.

6. Dies for forging steel wheels, consisting of an anvil-die having a smooth or flat upper surface and a vertical front portion provided at a point below the upper surface with a grooved support for the flange of the wheel-
 115 blank, in combination with a hammer-die having an under face corresponding in area to the face of the anvil-die, and a front projection above the support of the anvil-die and having its under surface to correspond to the
 120 flange of the wheel-blank.

7. Dies for forging steel wheels, consisting of an anvil-die having a smooth or flat surface and a vertical front portion provided at a point below the upper surface with a grooved support for the flange of the wheel-blank and a lateral support secured to the anvil-die and arranged to one side of the grooved support to hold the wheel-blank from moving laterally, in combination with a hammer-die having
 125 an under face corresponding in area to the face of the anvil-die, and a front projection above the said lateral support secured to the anvil-die and having its under surface shaped

to correspond to the flange of the wheel-blank.

5 8. Dies for forging steel wheels, consisting of an anvil-die having a smooth or flat upper surface and a vertical front portion provided at a point below the upper surface with a grooved support for the flange of the wheel-blank and a lateral support to the anvil-die and arranged to one side of the grooved support to hold the
10 wheel-blank from moving laterally, and detachable pins secured to the anvil-die laterally with respect to the grooved support and on the side opposite to the lateral support,

in combination with a hammer-die having an under face corresponding in area to the face 15 of the anvil-die, and a front projection above the support of the anvil-die and having its under surface shaped to correspond to the flange of the wheel-blank.

In testimony of which invention I hereunto 20 set my hand.

JAMES A. FACER.

Witnesses:

S. T. YERKES,

ERNEST HOWARD HUNTER.