No. 703,534. Patented July 1, 1902.

A. N. CAMERON.

APPARATUS FOR FORGING CAR WHEELS.

(Application filed Apr. 10, 1901.)

(No Model.)

Fig. 2.

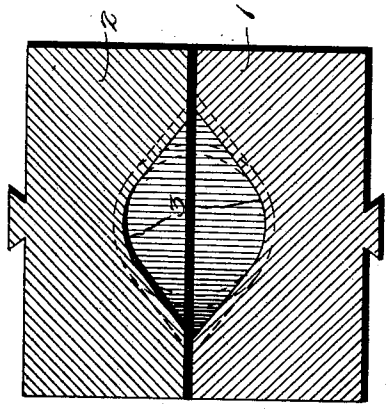
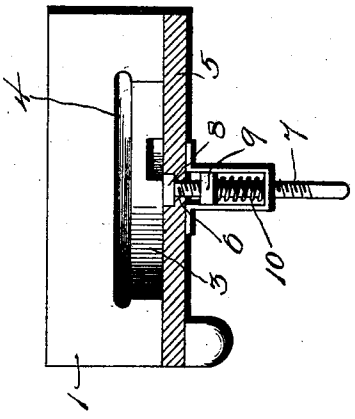


Fig. 4.



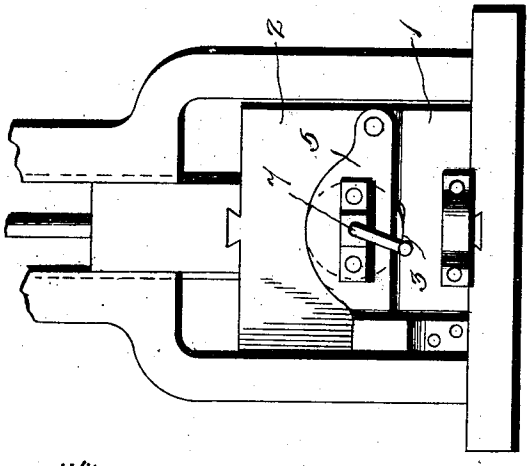
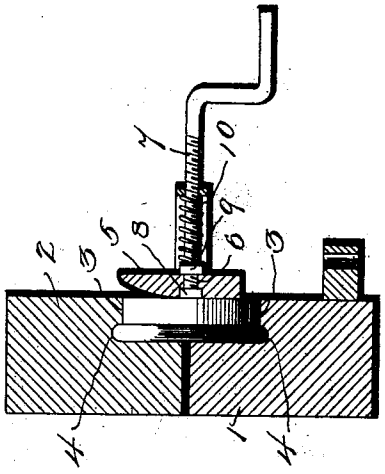


Fig. 3.



Witnesses:
D. L. Morehouse
Horace G. Sutz

Alexander N. Cameron Inventor

By Marion Marion

Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALEXANDER N. CAMERON, OF PERTH, CANADA.

APPARATUS FOR FORGING CAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 703,534, dated July 1, 1902.

Application filed April 10, 1901. Serial No. 55,262. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER N. CAMERON, a citizen of the Dominion of Canada, residing at Perth, in the Province of Ontario and Dominion of Canada, have invented certain new and useful Improvements in Apparatus for Forging Car-Wheels, of which the following is a full, clear, and exact specification.

My invention relates to improvements in apparatus for forging car-wheels, and has particular reference to improvements in the dies and to the means for retaining the ingot in position during the forming operation. In apparatus of this character wherein the flange of the car-wheel is being formed by the use of a hammer-and-anvil construction, and particularly in what is known as the "second stage" of such forming operation, the relative arrangement and formation of the anvil and hammer dies has been such as to render it practically impossible to complete the flanging of a car-wheel at one heating of the ingot, it being required that the ingot be taken from its position within the anvil-die, reheated, and then returned for the purpose of completing the flanging operation. This has necessarily required a considerable amount of time, in addition to which the reheating would tend to destroy the work performed on the first heating. Furthermore, the ingot being of considerable weight is difficult to handle, and the positioning of it within the die and the retaining of it in such position against the action of the hammer-die requires an expenditure of time, which, taken in connection with the requirement of a reheating of the ingot, increases the relative cost of manufacture to a considerable extent.

It is therefore the object, primarily, of my invention to provide a construction and arrangement of coöperating hammer and anvil dies which will operate with sufficient rapidity to complete the second stage of the forging process with but a single heating of the ingot.

Furthermore, it is the object of the invention to provide coöperating elements which will facilitate the manipulation of the ingot to such an extent that there will be no necessity of a reheating during this stage.

Other objects of the invention will be clearly apparent as said invention is hereinafter described.

The invention consists in the combination of an anvil and a hammer die each having segmental portions adapted to contact with the periphery of an ingot, the ends of said segmental portions being continued in a line tangential to said segmental portions.

Said invention consists, further, in the improved construction and combination of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the claims hereto appended.

In the accompanying drawings, in which similar numerals of reference indicate similar parts, Figure 1 is an elevation of a portion of a hammer having dies constructed in accordance with my invention. Fig. 2 is a vertical longitudinal sectional view taken through the dies. Fig. 3 is a vertical cross-sectional view taken at right angles to Fig. 2. Fig. 4 is a detailed sectional view showing the means for retaining the ingot in its proper position within the anvil-die during the operation.

In the drawings I have shown a conventional form of steam-hammer, it being understood that any preferred construction may be used, it being necessary only that provision be made in the base-plate and in the reciprocating portion of the hammer for the reception of the anvil and hammer dies, herein respectively designated as 1 and 2.

The anvil-die 1 is formed on its front face with a recess, the lower wall of which is formed segmental in shape at the center, the continuation thereof being tangential to said segmental portion. Said segmental portion (designated as 3) is of a curvature to correspond substantially with the periphery of the flanged ingot. Contiguous the rear wall of said recess the die is cut away, as at 4, to provide for the projecting flange of the wheel, said cut-away portion corresponding in curvature to the wall 3, thereby forming a die which will at the same time form both the flange and tread portion of the ingot.

The hammer-die 2 has a recess and cut-away portion corresponding with that of the anvil-die, the two dies being substantially similar in shape so far as the forming-faces thereof are concerned, although it is to be un-

derstood that the length of the segmental portion of the walls of the recesses may vary to some extent, as may be found desirable, it being preferable, however, to arrange the same substantially as shown in the drawings. This construction is preferred, for the reason that there is a considerable portion of the ingot brought into contact with both of the dies, thereby not only acting on a considerable portion of the periphery of the ingot at the same time, but insuring a more perfect finishing of the ingot. In fact, I have found by experiment that an ingot flanged in this manner seldom requires to be "trued," the coöperation of the specific dies rendering such secondary operation practically unnecessary. Furthermore, the peripheral surface of the ingot is acted upon to a considerable extent at each movement of the hammer-die, and it will not be necessary to retain said ingot in position within the dies to any greater length of time than is necessary for operation over its entire surface, and such length of time is correspondingly shortened by reason of the length of the contacting portions of the dies and the ingot. I would state that with the use of the two dies herein shown and described I have been able to completely perform the second stage of the flanging operation within a period of about six minutes, a time within which the ingot retains a sufficient heat to render it unnecessary to reheat it to complete the operation.

It will be understood that the acting faces of the dies may be formed either sectional and removable, made of a single piece and removably inserted within the die-blocks, or they may be formed directly within the die-blocks, the particular construction or the manner in which the faces are provided within the die-blocks being immaterial so long as the particular shape of the faces is provided.

The anvil-die is provided with a suitable opening for the reception of a bar or other means to enable the ingot to be readily turned within the anvil-die when the hammer-die is in its raised position.

It will be readily understood that means should be provided for the retaining of the ingot against lateral movement, either when the hammer-die is raised or when such die is operating to form the flange and tread. Various means have been provided for this purpose; but so far as I am aware, while performing the function required, there is present no aid in facilitating the movement of the ingot nor for its ready insertion and release from the dies.

As shown in the drawings, I have provided a pivotally-mounted plate 5, the pivot-point being at one side of the die-block and a suitable notch on the opposing side receiving the opposite end of said plate, the plate being of a suitable width, preferably extending upward a sufficient distance to cover the front face of the ingot when in position. At a suitable point within said plate substantially in alinement with the center of the ingot when in position I provide an opening 6, extending through said plate, the inner portion of which is enlarged, as shown in Figs. 3 and 4. To the outer face of said plate I secure a suitable U-shaped bracket, as shown in Fig. 4, the front portion of said bracket having an opening in alinement with the opening in the plate. If desired, suitable guides may be formed within the bracket. Extending through the openings in the plate 5 and the bracket is a screw-threaded rod 7, which is adapted, however, to have a free movement through said opening. The inner end of said rod is provided with a suitable collar 8, having a free movement rotatively on said rod, said collar normally resting within the enlarged portion of the opening 6. 9 designates a nut located on said rod on the opposite side of the plate, said nut being prevented from a rotating movement relative to the bracket by reason of its substantially fitting within the sides of the bracket. If desired, the nut may be provided with suitable lugs coöperating with grooves within the sides of the bracket for positioning the rod within the openings. Mounted on said rod and intermediate the front face of said nut and the inner wall of the front portion of said bracket is a spring 10, which tends to hold said nut in contact with the face of the plate 5. The front or outer end of said rod is provided with a suitable operating-handle, or, if desired, a hand-wheel may be used. When the rod is in its outer position, at which time the collar 8 abuts against the inner face of the plate, while the nut 9 abuts against the outer face of the plate, the face of the collar is substantially flush with the face of the plate, so that said plate may be freely moved on its pivot regardless of the presence of the ingot or the hammer-die. When it is desired to secure the ingot in position, the rod is rotated, in which case the inner end of said rod is carried upward and against the face of the ingot by reason of the screw-threaded connection with the nut 9, the spring tending to hold said nut in its position against the face of the plate. When the collar contacts with the ingot, a further rotating of the rod serves to move the nut away from the face of the plate, thereby compressing the spring 10 and gradually increasing the tension of the spring, so as to adjustably regulate the force with which said collar contacts with the face of the ingot. Inasmuch as movement of the hammer-die is directly at right angles to the direction in which the spring is exerting its tension, it will be readily understood that there is no requirement of an extremely heavy spring, so that the degree of pressure on the face of the ingot can be adjustably regulated. Furthermore, this form of mounting provides what might be termed a "cushioned" support, so that when the hammer-die is raised and it is desired to rotate the ingot there will be no requirement of the unscrewing of the retaining

means, said cushion permitting such slight movement as may be necessary without necessitating the releasing of the rod, such as is required where there is a fixed screw-threaded connection between the bracket and the rod.

Having thus described my invention, what I claim as new is—

1. In apparatus of the character specified, the combination with a hammer-die and an anvil-die, of a cushioned support carried by said anvil-die, adapted to support the ingot against lateral movement.

2. In apparatus of the character specified, the combination with a hammer-die and an anvil-die, of a plate pivotally mounted on said anvil-die and adapted to extend across the face of the ingot, and a cushioned pressure device carried by said plate adapted to retain said ingot against lateral movement.

3. In apparatus of the character specified, the combination with a hammer-die and an anvil-die, of a plate pivotally mounted on said anvil-die and adapted to extend across the face of the ingot, and a rod extending through said plate, said rod having cushioning means, the inner end of said rod abutting against the face of the ingot and preventing lateral movement thereof.

4. In apparatus of the character specified, the combination with a hammer-die and an anvil-die, of a plate pivotally mounted on said anvil-die and adapted to extend across the face of the ingot, a screw-threaded rod extending through said plate, a bracket for supporting said rod, a nut carried by said rod and positioned by said bracket, and a spring carried by said rod and adapted to form a pressure device when the inner end of said rod is brought into contact with the face of the ingot, to prevent lateral movement of the latter.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

ALEXANDER N. CAMERON.

Witnesses:

T. A. BAIRD,

JENNIE E. CONNELLY.