F. P. BATES.

FORGING MACHINE.

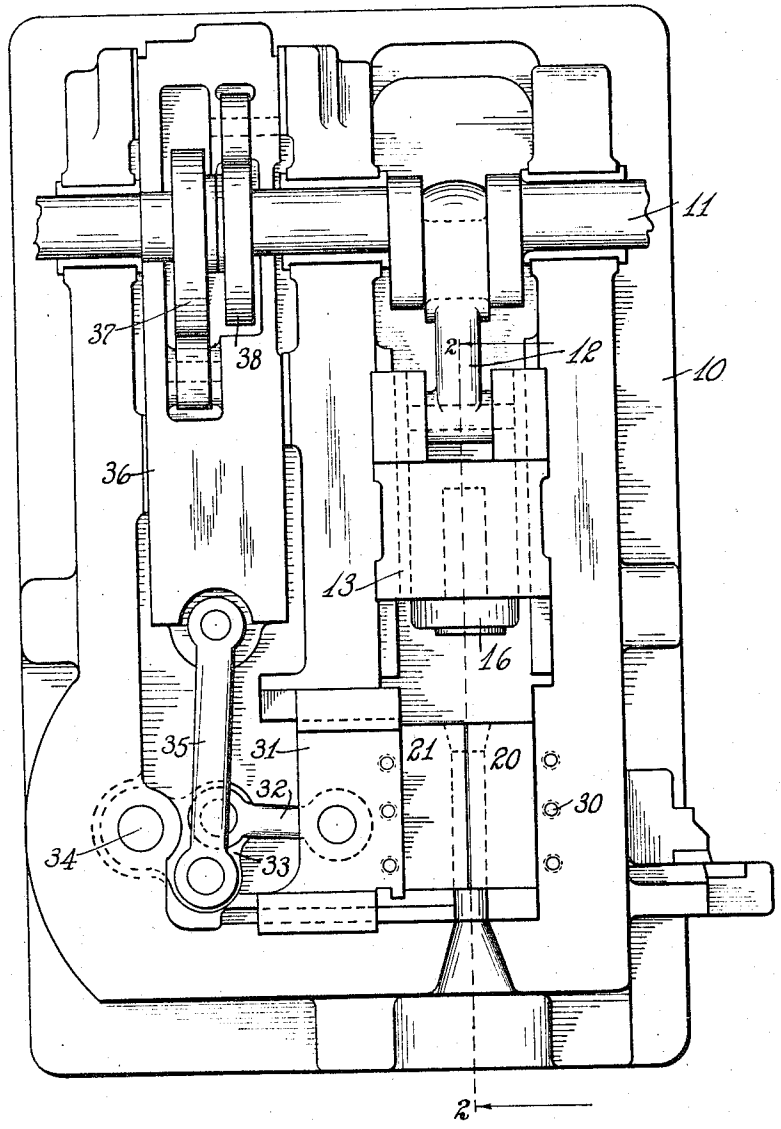
APPLICATION FILED JAN. 22, 1915.

1,169,914.

Patented Feb. 1, 1916.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

A H Edgerton.

R G Lockwood

INVENTOR

Franklin P. Bates

BY

V. H. Lockwood.

ATTORNEY

F. P. BATES.

FORGING MACHINE.

APPLICATION FILED JAN. 22, 1915.

1,169,914.

Patented Feb. 1, 1916.

2 SHEETS—SHEET 2.

Fig. 2.

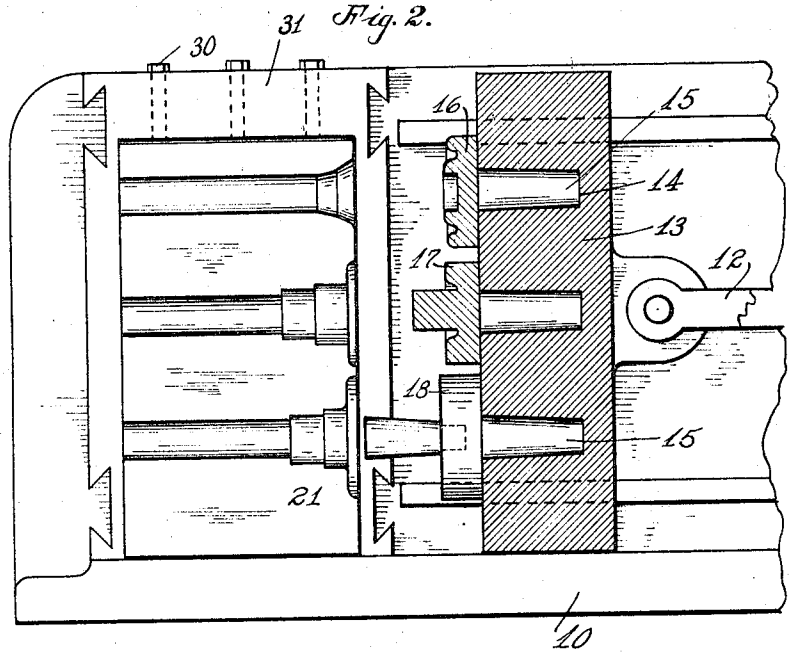


Fig. 3.

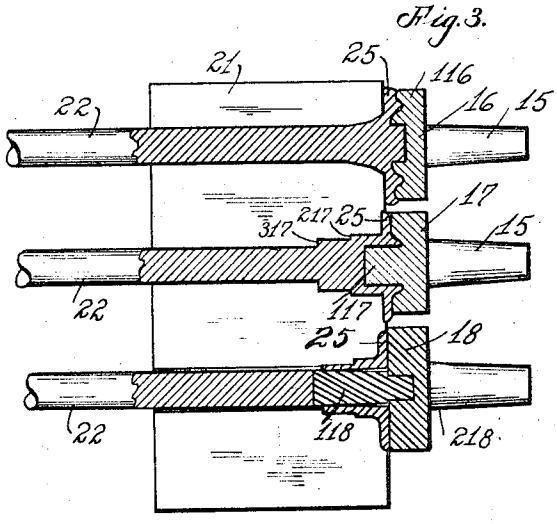
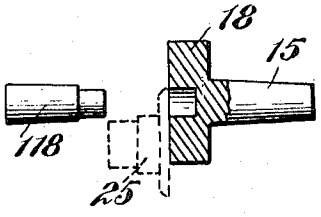


Fig. 4.



WITNESSES:

A. H. Edgerton

R. G. Eastwood

INVENTOR

Franklin P. Bates

BY

V. H. Eastwood,

ATTORNEY

UNITED STATES PATENT OFFICE.

FRANKLIN P. BATES, OF INDIANAPOLIS, INDIANA.

FORGING-MACHINE.

1,169,914. Specification of Letters Patent. Patented Feb. 1, 1916.

Application filed January 22, 1915. Serial No. 3,816.

To all whom it may concern:

Be it known that I, FRANKLIN P. BATES, a citizen of the United States, and a resident of Indianapolis, county of Marion, and State of Indiana, have invented a certain new and useful Forging-Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like letters refer to like parts.

The object of this invention is to diminish the cost of manufacturing or forging tubular articles such as bicycle hubs and the like, by dies so as to greatly diminish the cost thereof chiefly by virtue of the increased output of the machine.

The chief feature of the invention consists in forming a hub or hollow article of considerable width or length out of a solid bar or like body of metal by the coöperation of male and female dies, one of said dies forcing a rearwardly tapering plunger through the article for forming an opening through it and separating it from the body of the bar. This is repeated until the bar is wholly used each operation forming an article. By tapering the plunger rearwardly it can be forced through a wide or long article without difficulty, the tapering form thereof permitting the plunger to clear the bore of the article and to separate the bar therefrom.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

In the drawings, Figure 1 is a plan view of the machine. Fig. 2 is a vertical section on the line 2—2 of Fig. 1. Fig. 3 is the same as Fig. 2 with portions removed and the dies and bars in cross section showing the dies in operated position. Fig. 4 shows the tapering plunger removed from the die with the finished article escaping therefrom, a part of the die being in section.

There is shown herein a machine frame 10 on which there is mounted a driving crank shaft 11 having a pitman rod 12 which extends and is pivoted to a die holding block 13 slidably mounted in the frame, as shown in Fig. 2. This block has a number of sockets 14 for receiving shanks 15 of dies 16, 17 and 18. There is shown a series of three dies in said die holder 13 which coöperate with companion clamping die members 20 and 21, each of which has a corresponding opening for receiving a solid bar of metal 22 from which the article is to be formed. The metal bar 22 is clamped between the die members 20 and 21, as shown in Figs. 1 and 3, and its end is upset first by die 16 which partially forms the desired article. The die 17 has a relatively long central plunger or projection 117 which is forced into the metal as shown in the middle of Fig. 3, for laterally spreading the same, and it coöperates with a somewhat corresponding formation of the surfaces of the clamping die members 20 and 21. Thus the die opening between said clamping die members for receiving the die and the metal to be acted upon by the die 17 is at its outer end considerably enlarged and forms a shoulder 217 and then another section thereof is enlarged and forms a shoulder 317. The formation of these clamping die members for the action of the second die 17 is such as to give to the portion of the article which lies between said die members 20 and 21 their finad diameters and superficial form.

The third die 18 finishes the external and superficial form of the article and it has a tapering socket 218 in it for receiving loosely the reduced end of the tapered plunger 118. This plunger is forced entirely through the article and therefore completes the formation of the central bore of the article which was begun by the projection 117 of die 17, in the previous step of the operation. During this last step of the operation the main body of the metal bar 22 is not clamped but is free as shown in Fig. 3, while the portion of said bar 22 which is integral with the incompleted article, at the beginning of this last step of the operation is securely clamped in position and the clamping parts of the die members 20 and 21 have the same conformation in the third step of the process as in the second.

The plunger 118 tapers rearwardly and therefore, it is forced through the body of the metal lying in the enlarged portion of the opening between the clamping dies 20 and 21, and the diameter of the plunger 118 at its advanced end is substantially the same as the body of bar 22, so that, when the plunger is forced through the article, it will cut off and separate and push out of the way

the main body of the metal bar 22. And the plunger passes entirely through the article with its advanced end beyond the article so that it can be passed on through the article for its removal therefrom as seen in Fig. 4.

Since the plunger 118 tapers rearwardly it never gets wedged in or bound by the article nor does the article shrink up on it as would be the case if the plunger were not tapering, so that the plunger could not be removed. For when the plunger is of uniform diameter and is forced through the article it could not be withdrawn from the article but with this rearwardly tapering form there is no difficulty in removing the plunger but it is removed by merely advancing it on through the article.

The invention claimed is:

1. In a machine for making a tubular article from a solid bar, a plunger reduced at one end for forming a central bore through an article, and means for forcing said plunger through the article with the large end thereof foremost, whereby the plunger can be further advanced entirely through the article after the latter is formed for removing it.

2. In a machine for making a tubular article from a solid bar, means for partially forming an article on one end of the bar, means for clamping said partially formed portion of the article which is arranged to leave the remainder of the bar free, a plunger reduced at one end with its large end having substantially the same diameter as the body portion of said bar, and means for forcing said plunger through the article with the large end thereof foremost, whereby the bore will be made through said article and the body of the bar be separated therefrom.

3. A machine for making a tubular article from a solid bar including means for partially forming the article at one end of the bar, means for clamping the partially formed article which is arranged to leave the remainder of the bar free, a die for finally forming the outer end of the article, said die having a tapering socket therein, and a tapering plunger with the small end in said socket and with the large end having a diameter substantially the same as the diameter of the body of the bar and adapted to be forced through the article by the die substantially as set forth.

4. A machine for making a tubular article from a solid bar including means for partially forming the article on one end of the bar, means for clamping said partially formed portion of the article which is arranged to leave the remainder of the bar free, a die, a plunger removably secured thereto with its reduced end toward the die and with its large end having substantially the same diameter as the body portion of the bar, and means for forcing said plunger through the article with the large end thereof foremost, whereby the bore will be made through said article and the plunger can be advanced entirely through the article for separating it and the article.

In witness whereof, I have hereunto affixed my signature in the presence of the witnesses herein named.

FRANKLIN P. BATES.

Witnesses:
J. H. WELLS,
R. G. LOCKWOOD.