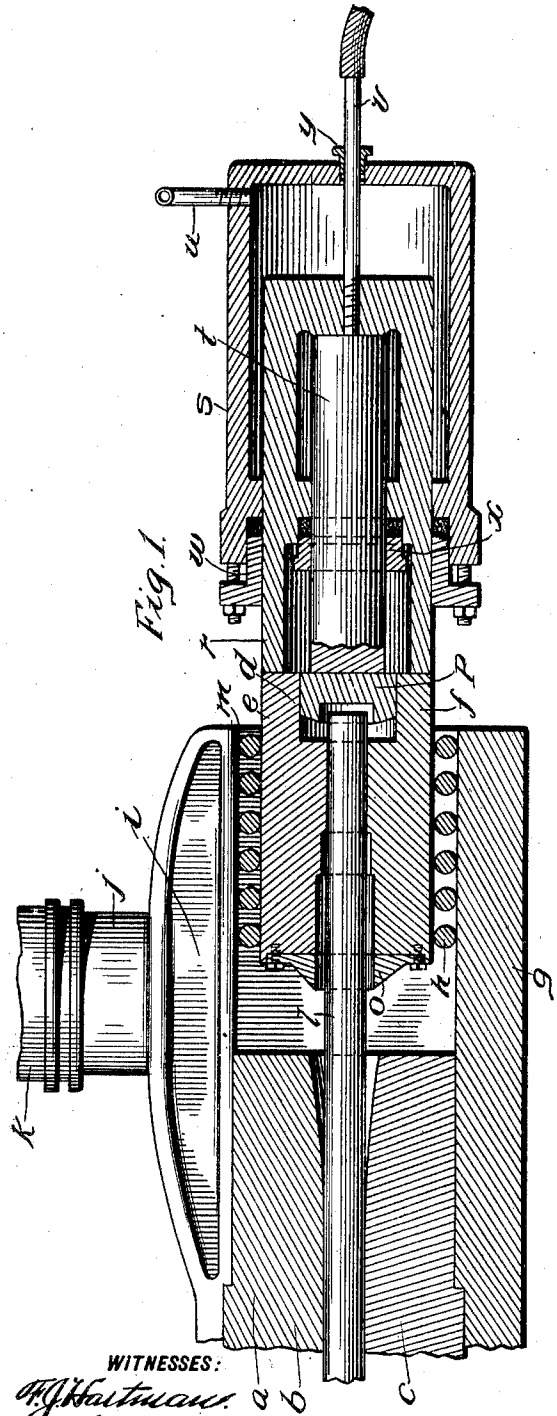
No. 760,220. PATENTED MAY 17, 1904.

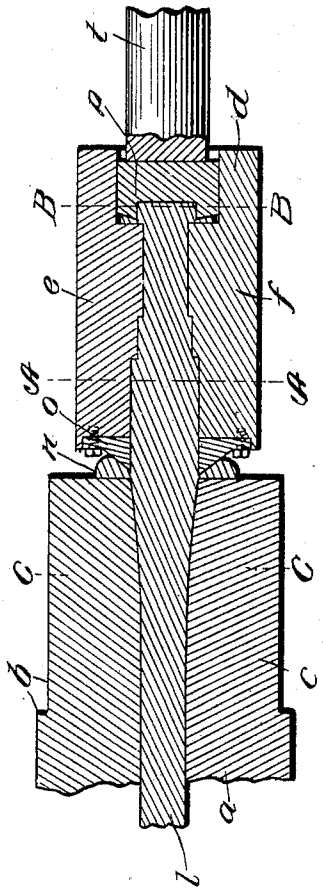
H. V. LOSS.

MACHINE FOR UPSETTING METAL.

APPLICATION FILED DEC. 8, 1903.

NO MODEL. 2 SHEETS—SHEET 1.





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APPLICATION FILED DEC. 8, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

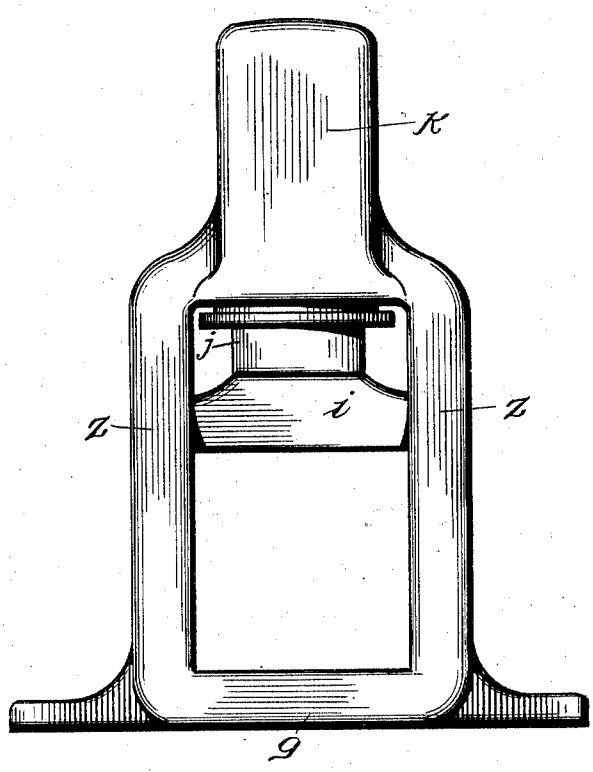


Fig. 4.

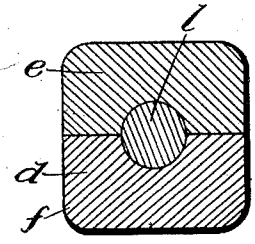


Fig. 5.

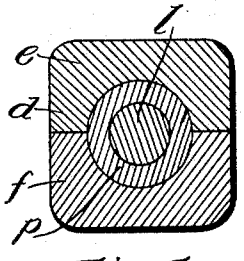


Fig 6

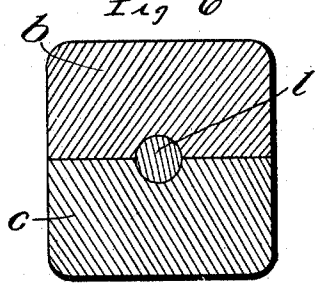
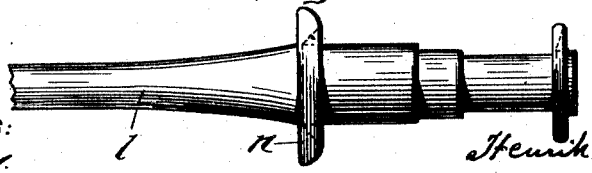


Fig. 7.



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No. 760,220. Patented May 17, 1904.

UNITED STATES PATENT OFFICE.

HENRIK V. LOSS, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR UPSETTING METAL.

SPECIFICATION forming part of Letters Patent No. 760,220, dated May 17, 1904.

Application filed December 8, 1903. Serial No. 184,262. (No model.)

To all whom it may concern:

Be it known that I, HENRIK V. LOSS, a citizen of the United States, and a resident of the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Machines for Upsetting Metal, of which the following is a specification.

My invention relates to improvements in machines for upsetting bars or billets; and the object of my invention is to furnish a machine in which a bar or billet may be upset in one heat to form an axle or similar article, thus reducing the time and cost of manufacture and increasing by this method of forging the quality of the finished article.

In carrying out my invention I take a bar or billet the extreme diameter of which approximates the middle diameter of the axle or other article to be forged and which is of a suitable length for the purpose, heat it to the proper temperature and place it in a stationary die which grasps it at or near the middle and in a movable die which grasps it at a place between the first die and its end, and I then move the movable die toward the stationary die to upset and complete the formation of the inner part of the bar. After the completion, wholly or partly, of the action of the movable die I engage the end of the bar by a movable header-die to complete the formation of the outer end of the article. In most cases I prefer to furnish the inner end of the movable die with a device which will cut off the fin caused by the overflow of surplus metal, not only for the purpose of making a better finished article, but to prevent the metal in the fin from blocking the movement of the movable die prematurely.

In forging articles that have two forged ends—an axle, for example—I prefer to use in connection with a single stationary holding-die two sets of movable dies, one set for each end of the bar, similar members of both sets of dies operating simultaneously toward the middle of the bar. While I prefer this construction, it is not obligatory, as the opposite ends of the bar may be forged separately, if desired.

In order to conveniently remove the forged article from the dies, the latter are made sectionally, a suitable die-closer being used for holding the sections together.

Although the movable and header dies may be operated in any convenient manner, I have illustrated in the drawings and fully describe hereinafter an arrangement of hydraulic pistons for accomplishing this end.

In the accompanying drawings, forming part of this specification and in which similar letters of reference indicate similar parts throughout the several views, Figure 1 is a central longitudinal sectional view through my upsetting-dies and the hydraulic means for operating them, a die-closer being shown in side elevation, the dies being shown at the commencement of their stroke; Fig. 2, an end elevation of the die-closers, the cylinder for carrying their actuating-piston, and the housings for the movable and stationary dies; Fig. 3, a sectional view of the dies at the completion of their strokes; Fig. 4, a section of Fig. 3 on line A A; Fig. 5, a section of Fig. 3 on line B B; Fig. 6, a section of Fig. 3 on line C C; Fig. 7, a side elevation of one-half of a forged axle.

a is a stationary holding-die for purposes of convenience formed in longitudinal sections *b c*.

d is the movable die, likewise formed in longitudinal sections *e f*.

g is a base which carries die *a* and through rollers *h* the movable die *d*.

i is a die-closer carried by a piston *j*, which is carried by a hydraulic cylinder *k*, which operates in a well-known manner.

The base *g* is connected to the cylinder *k* by ties or connections Z on each side of the die system, so as to bring the reaction of the cylinders down into the base, thus forming a self-contained unit or housing.

The die-closer *i* engages the top of die *a* and through rollers *m* the top of the die *d* and causes these dies to grasp the bar or billet *l*.

The dies having been closed upon the bar or billet, the movable die is driven toward the stationary die, and the metal of the bar or billet between the points grasped by the dies is upset until it completely fills all of the spaces in them. The surplus metal flows out between the stationary and movable dies as a fin, which is engaged by a cutter *o*, carried by one of the dies, and cut off as this latter die advances. This not only produces a better finished article, but removes the fin by turning it up and permits the sliding die to fully complete its stroke. After the sliding die has wholly or partly completed its stroke the header-die *p*, which engages, preferably, telescopically with the sliding die, as shown, is moved in to upset the head of the bar or billet.

In the drawings the dies are shown arranged for forging an axle, both ends of which are alike. I have only shown the dies for forging one end of the axle, as those for the other end are precisely similar in construction.

The movable and header dies are operated by a hydraulic arrangement constructed as follows: *s* is a hydraulic cylinder carrying a hollow piston *r*, which is closed at its rear end. The front part of this piston is annular and is adapted to engage the rear end of the die *d*. *t* is a piston carried within piston *r*, the front end of which engages or which may form the header-die *p*. *w* is the gland in which piston *r* works; *x*, the gland in which piston *t* works. *u* is a pipe through which the actuating liquid enters cylinder *s*; *v*, the pipe through which the actuating liquid enters piston *r*. The latter pipe, owing to the movement of piston *r*, passes out of cylinder *s* through a gland *y*.

In operating the machine liquid is first admitted to cylinder *s*, and the piston *r* is driven forward, carrying the piston along with it, thus driving before it simultaneously the movable dies *d* and *p*. As soon as the movable die has wholly or partly completed its stroke liquid is admitted to the interior of piston *r* and the piston *t* is driven forward to cause the header-die *p* to upset the end of the bar.

In Fig. 3 the dies are shown at the end of their stroke and the axle forged. Figs. 4, 5, and 6 show sections of the dies on lines A A, B B, C C, and Fig. 7 a side elevation of one end of the forged axle.

In an application for patent of the United States bearing even date herewith I have described and claimed the method for upsetting metal bars which is carried out by the machine herein described and claimed.

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

1. The combination of a stationary, separable die, adapted to surround and grasp a bar or billet, a second similar die adapted to grasp the bar or billet between the point of engagement of the first die therewith and one end of the bar, a cutter carried by and surrounding the opening of one of said dies, and a header-die adapted to engage the end of the bar or billet; said second die and said header-die being adapted to move axially with relation to the stationary die and with one another.

2. The combination of a stationary, separable die, adapted to surround and grasp a bar or billet, a second similar die adapted to grasp the bar or billet between the point of engagement of the first die therewith and one end of the bar, a header-die adapted to engage the end of the bar or billet, said second die and said header-die being adapted to move axially with relation to the stationary die and with one another, and a cutter carried by the forward end of the second die.

3. The combination of a relatively stationary, separable die, a second similar die movable axially in relation to the stationary die, and a movable header-die arranged to engage said second die telescopically.

4. In combination, a relatively stationary, separable die, a second separable die movable axially in relation to said first die, and a cutter carried by and surrounding the opening of one of said dies.

5. In an upsetting-machine, in combination, a relatively stationary separable die, a second similar movable die, a die-closer for closing said dies upon a bar or billet, a header-die, a power-actuated cylinder, a hollow piston within said cylinder adapted to engage the outer end of said movable die, means for admitting the driving medium to said cylinder to actuate said piston, a piston within said hollow piston adapted to engage and operate said header-die, and means for admitting the driving medium to said hollow piston to operate said second piston.

HENRIK V. LOSS.

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