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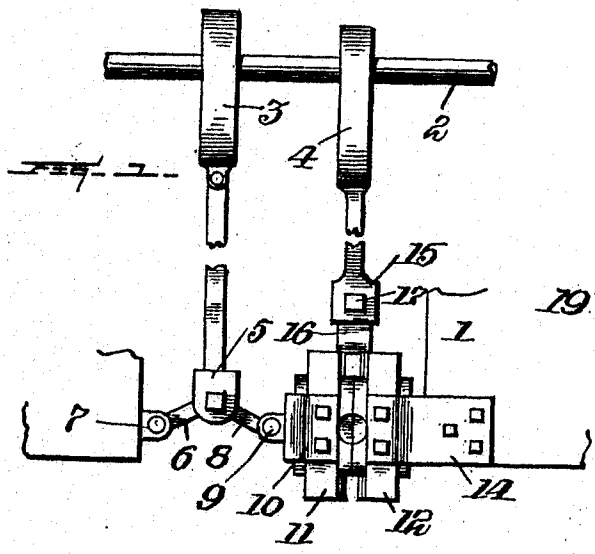
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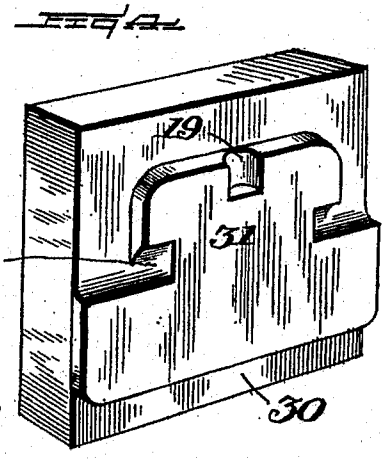
H. JEFFREY.

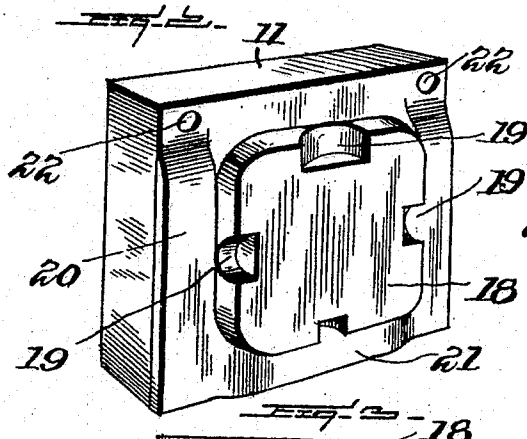
COMBINATION DIE FOR FORGING MACHINES.

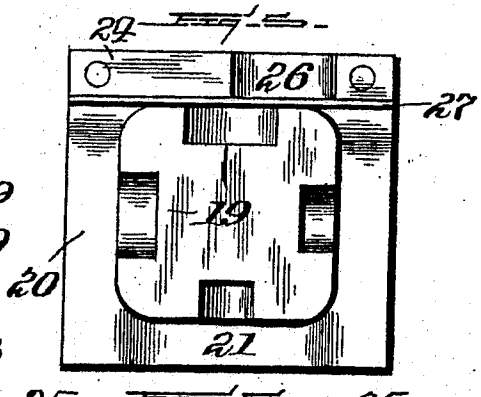
APPLICATION FILED APR. 15, 1902.

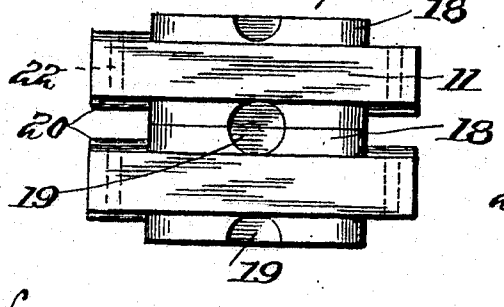
NO MODEL. 2 SHEETS—SHEET 1.

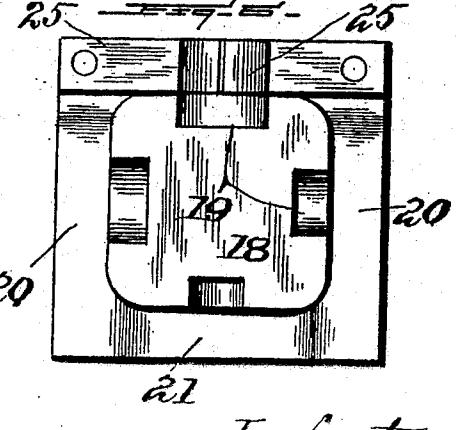












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78. METAL FORGING & WELDING,
Forging Dies.

Draftsman.

No. 757,197. PATENTED APR. 12, 1904.

H. JEFFREY.

COMBINATION DIE FOR FORGING MACHINES.

APPLICATION FILED APR. 15, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 12.

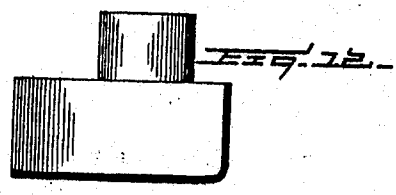


Fig. 1.

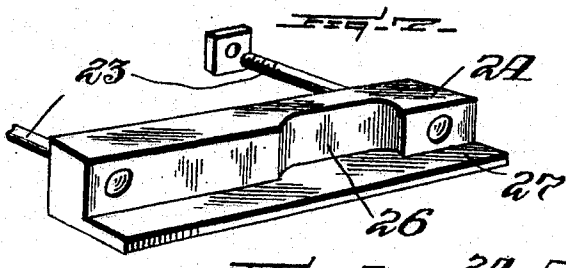


Fig. 13.

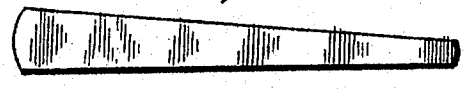


Fig. 8.

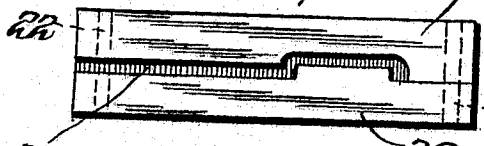


Fig. 14.

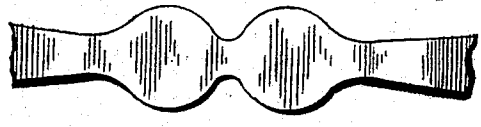


Fig. 9.

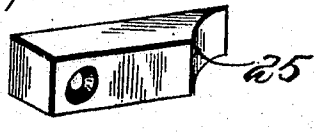


Fig. 15.

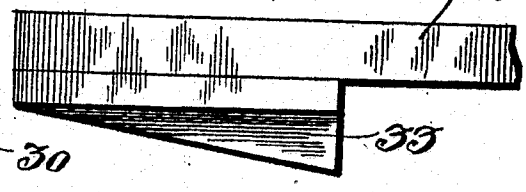


Fig. 10.

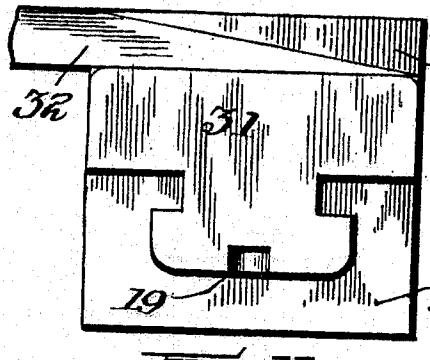


Fig. 16.

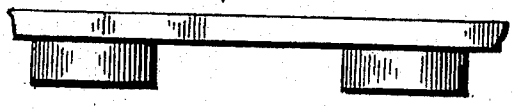


Fig. 17.

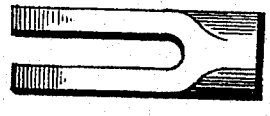


Fig. 11.



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No. 757,197. Patented April 12, 1904.

UNITED STATES PATENT OFFICE.

HARRY JEFFREY, OF ALLEGHENY, PENNSYLVANIA.

COMBINATION-DIE FOR FORGING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 757,197, dated April 12, 1904.

Application filed April 15, 1902. Serial No. 102,979. (No model.)

To all whom it may concern:

Be it known that I, HARRY JEFFREY, a citizen of the United States of America, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Combination-Dies for Forging-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in multiple dies for forging-machines, and has for its object to provide a pair of multiple dies wherein all kinds of locomotive-forgings may be formed.

Another object of my invention is to provide a pair of multiple dies to which a pair of auxiliary dies may be attached for forming all kinds of clamps, brackets, and the like.

A still further object of my invention is to provide multiple dies wherein wedges, keys, and all kinds of tapering work may be formed and also to provide a pair of dies that will be extremely simple in construction, strong, durable, comparatively inexpensive to manufacture, and with which the forming of all kinds of forging may be readily performed with great rapidity.

As now generally practiced it is the usual custom to employ single dies for each separate piece or article that is to be made—that is, a pair of dies for forming each separate piece or article. When the machine is working or making one piece or style of forging and it is desired to make another piece or article, it has heretofore been necessary to loosen the grippers, remove the pair of dies then in the machine, and insert a different pair of dies shaped to produce the desired different style of forging. In my invention, however, the pair of dies is so constructed as to permit of the forming of a plurality of different articles or styles of pieces or forgings with the same pair of dies, thus not only materially facilitating the work of forging, but also decreasing the cost thereof very materially, since the stock of dies required is reduced to a very considerable extent.

With the above and other objects in view the invention consists in the novel construction, combination, and arrangement of parts to be hereinafter more fully described, and specifically pointed out in the claims.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, and wherein like numerals of reference indicate like parts throughout the several views, in which—

Figure 1 is a top plan view of a pair of locomotive-dies in connection with a diagrammatical view of the machine. Fig. 2 is a perspective view of one of the dies. Fig. 3 is a top plan view of a pair of dies in closed position. Fig. 4 is a perspective view of a modified form of die. Fig. 5 is a side elevation of the form of die shown in Fig. 2, showing an auxiliary die attached thereto. Fig. 6 is a side elevation of the form of die shown in Fig. 2, showing another form of auxiliary die attached. Fig. 7 is a detached perspective view of one form of auxiliary die. Fig. 8 is a top plan view of a pair of auxiliary dies in closed position. Fig. 9 is a perspective view of one member of another form of my auxiliary die shown in Fig. 5. Fig. 10 is a side elevation of the form of main die shown in Fig. 4, in inverted position and showing a piece of metal in place which has been formed into a wedge. Fig. 11 is a top plan view of a part of a forging formed by a pair of improved dies. Fig. 12 is a side elevation of one of the heads for the plunger. Fig. 13 is a plan view of a key formed by a pair of my improved dies. Fig. 14 is a plan view of a forging formed by a pair of my improved dies. Fig. 15 is a side elevation of a portion of the plunger, showing the wedge-shaped head. Fig. 16 is a plan view of another form of forging formed by a pair of my dies. Fig. 17 is a like view of still another form of forging formed by a pair of my dies.

1 represents a portion of an ordinary forging-machine in which a pair of my improved multiple dies are placed side by side for constructing the different forgings required for locomotives. 2 represents a power-shaft of said machine, which carries eccentrics 3 and 4, the eccentric 3 being connected to the center toggle-block 5, one arm, 6, of the toggle being pivotally secured at 7 to a stationary toggle-block, and the other arm, 8, being pivotally

connected, as indicated at 9, to the movable gripper or clamp 10. It will be readily understood that by revolving the shaft 2 the eccentric 3 will force the toggle lever-arms 6 and 8 back and forth, thus giving side movement to the gripper or clamp 10, which holds the multiple die 11. A multiple die 12 is held stationary by the fixed gripper or clamp 14, carried by the body portion of the machine 1.

15 represents a plunger which is operated by the eccentric 4, carried by the shaft 2, the plunger 15 carrying a beveled detachable head or hammer 16, which is secured in position in the plunger by means of the bolt 17. This arrangement allows the placing of any desired shaped head or hammer in the plunger for producing the different forgings used on locomotives.

The pair of multiple dies 11 and 12 are preferably square in form and carry upon their sides centrally raised or projecting die portions 18, leaving marginal surfaces extending outwardly from the die portions, said raised or projecting die portions having a number of recesses 19 in their faces, at the edges thereof, which differ in size and conform in shape to the articles to be formed. These multiple dies 11 and 12 are also formed with raised portions 20 and 21 at the edges of the centrally-raised portions, the said raised portions corresponding in height and thickness according to the depth of the apertures 19 and according to the thickness of the piece of metal from which the different forgings—such as brackets, clamps, keys, and wedges—are to be formed. These multiple dies 11 and 12 have corner-apertures 22 in one of their edges, said apertures being formed therein for the reception of the bolts 23, which carry auxiliary dies 24 and 25. By means of these auxiliary dies, which are attached to the main dies 11 and 12, I am able to form brackets and the like, which is accomplished by means of having the auxiliary dies conform to the desired shaped bracket required for locomotive-fixtures and the like.

26 indicates a cut-away portion or recess on the face of the auxiliary die 24, said auxiliary die 24 having an extension 27 upon its base, upon which is seated the piece of metal to be shaped, said piece of metal being formed in the opening 28, which is left between the auxiliary movable die 24 and the auxiliary stationary die 29.

In Figs. 6 and 9 of the drawings I have shown another form of auxiliary die, which consists of two members formed as shown in Fig. 9, said members being secured upon the main die in any suitable manner, but preferably by means of bolts 23.

30 indicates a modified form of main die which is used to form clamps and the like, said main die 30 having a raised portion on each side thereof, as indicated at 31. This main die 30 is also used, as indicated in Fig. 10 of the drawings, for forming wedges, keys, and all kinds of tapering work. When the wedges are to be formed, the head of the plunger is changed to conform in shape to the desired forging. In Figs. 10 and 15 I have illustrated the manner in which the wedge-shaped piece is formed. The bar, which has been heated to the desired temperature, is placed against the projection 31 of the main die 30, and upon the plunger striking upon the piece of metal the metal is forced into the bar, forming the wedge-shaped piece, as indicated at 32. It will be noted that the plunger 15 carries for this purpose a wedge-shaped head 33, which forms the wedge, as shown in Fig. 10 of the drawings. In Fig. 12 of the drawings I have illustrated another form of plunger-head, this form being used in the forging of toggle-levers and the like. (Shown in Figs. 11 and 16 of the drawings.) In this instance the piece of material is placed in the grooves against the die portions of the main dies, the circular bosses or buttons being impressed on the material by the recesses in which the material is forced by the hammer.

In Fig. 13 of the drawings I have illustrated the form of wedge or key which is formed by means of the main dies and plunger.

In Fig. 17 of the drawings I have shown the form representing the coupling which is formed by the main dies and the plunger. The coupling-piece shown is formed by placing the ends of two pieces of material between the main dies, and when the movable gripper is closed the inner ends of the pieces are welded together in the rounded shape shown.

In Fig. 14 is illustrated the bracket which is formed by the dies and plunger. The original shape of the piece of material to form the forging represented by this figure is oblong and is placed between the dies edgewise across coinciding recesses in vertical position prior to closing the movable gripper, and the latter is only sufficiently closed to preserve the shanks, the metal being forced into the coinciding recesses. Now assuming that the dies are clamped in position with the working recesses in each die innermost, the forgings are being made in these recesses of the two dies, and if it is desired to make forgings of a different style, such as would be made in the other recesses, then the gripper or clamp 10 is simply slackened from out of engagement with the dies and the dies are given one quarter-turn in the grippers or clamps, so as to bring the other recesses into registry. The grippers or clamps 10 and 14 are then tightened and the work proceeded with instead of requiring the substitution of an entirely new set of dies, as in the former practice.

Fig. 4 simply shows a die provided with different forms of die-cavities or faces, and in Figs. 5 and 6 I show auxiliary dies which may be attached directly to the main dies, so that still further different forms of forgings may be

produced without requiring new or substitute dies therefor. With the auxiliary die I may construct engine-brackets in the die-cavity 28, the auxiliary dies being secured to the main dies by means of bolts passed through the openings 28, provided therefor in the main dies. As seen in Fig. 6, the size of cavity may be increased by attaching the auxiliary die to the main die.

It will be noted that the dies as illustrated in the drawings are capable of forming any number of forgings which will be different in shape, these forgings being formed by the recesses and cut-away portions carried by the dies, also by the auxiliary dies which are attached to the body portion of the die. It will be seen from the drawings that various kinds of forgings have been shown, and these forgings have been formed by the recesses in the members carried by the auxiliary die; but I do not desire to limit myself to this construction, but may form the forgings required for any machine.

The many advantages obtained by my device will be readily apparent from the foregoing description, taken in connection with the accompanying drawings.

Heretofore considerable labor and trouble have been caused by the forming of fins upon the forgings. In my improved dies these fins are not developed by forcing the metal rearwardly into the bar, thus giving greater rigidity and tenacity to the metal. It can be readily seen that this feature of forging is of great importance, and the dispensing of this waste and inconvenience greatly enhances the value of my dies.

It will be noted that various changes may be made in the details of construction without departing from the general spirit of my invention.

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

1. A multiple die for forging-machines comprising a die-block constructed on a side thereof, with a centrally-raised die portion leaving marginal surfaces extending outwardly from the die portion and providing grooves at the edges thereof in advance of which the hammer is adapted to operate, and having recesses of different dimensions formed in the face thereof at the edges of the latter, and raised portions upon the marginal surfaces at the edges of the die portion of a thickness equal to the depth of the die portion beneath the recesses.

2. The combination of a main die-block, an auxiliary die-block, and means for securing the auxiliary die-block to a side of the main die-block at an edge of the latter.

3. The combination of a main die-block constructed on a side thereof, with a centrally-raised die portion providing grooves at the edges thereof, an auxiliary die-block seated in a groove against the die portion and means for securing the auxiliary die-block to the main die-block.

In testimony whereof I affix my signature in the presence of two witnesses.

HARRY JEFFREY.

Witnesses:
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E. E. POTTER.