

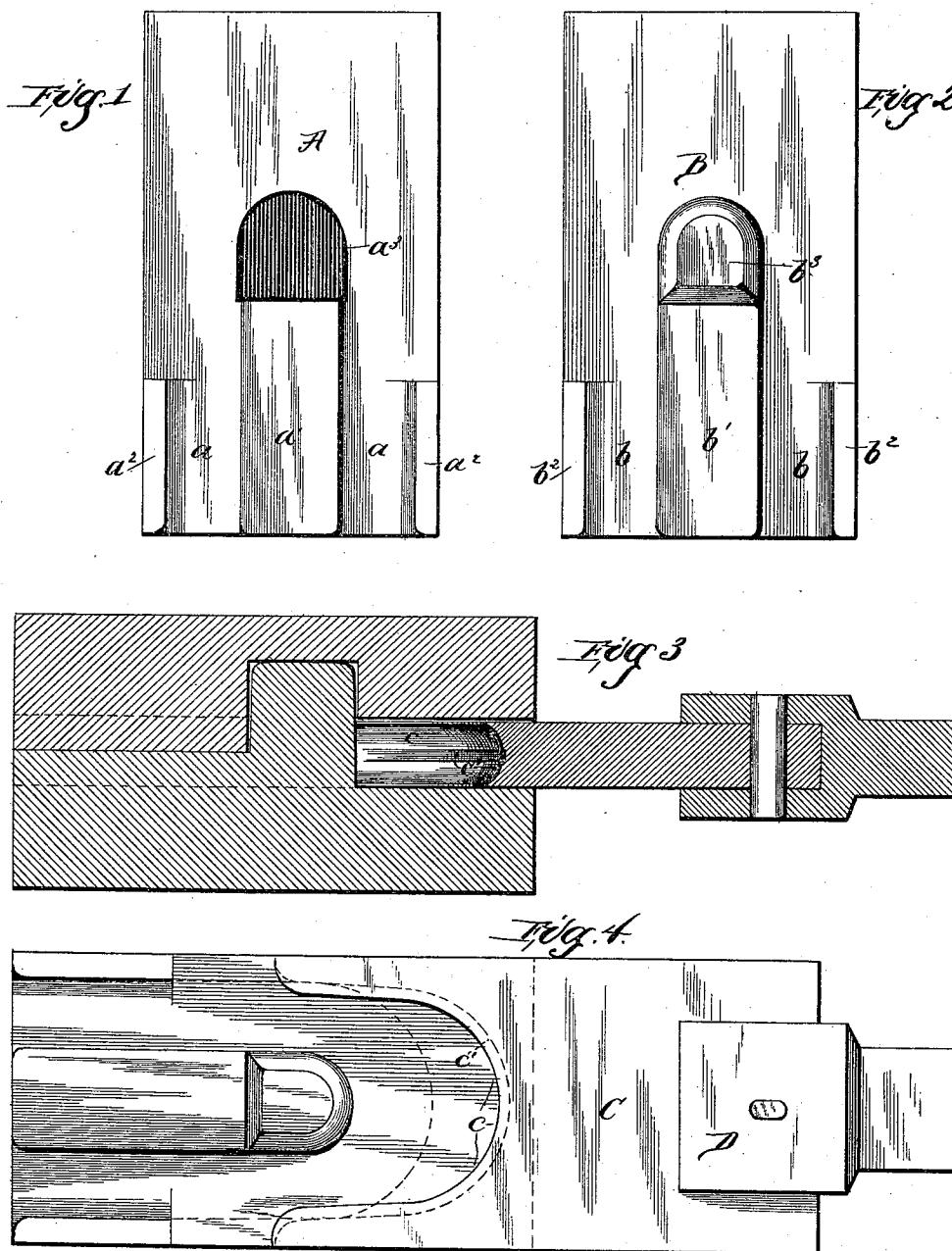
(No Model.)

M. KENNEDY.  
DIE FOR COUPLING LINKS.

2 Sheets—Sheet 1.

No. 428,279.

Patented May 20, 1890.



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John J. Scott  
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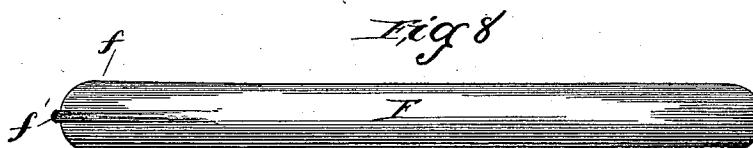
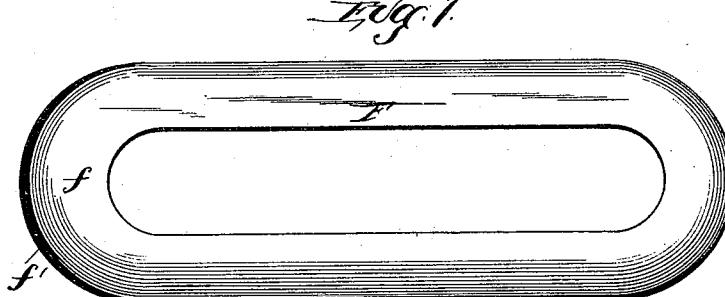
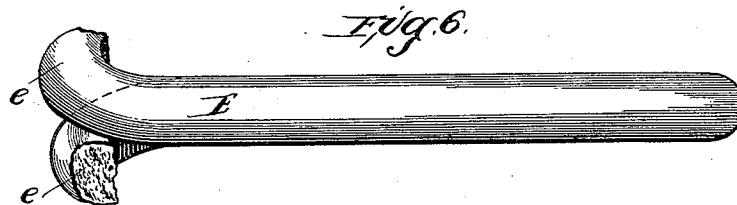
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2 Sheets—Sheet 2.

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# UNITED STATES PATENT OFFICE.

MARTIN KENNEDY, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE UNITED STATES ROLLING STOCK COMPANY, OF SAME PLACE.

## DIE FOR COUPLING-LINKS.

SPECIFICATION forming part of Letters Patent No. 428,279, dated May 20, 1890.

Application filed January 18, 1890. Serial No. 337,296. (No model.)

*To all whom it may concern:*

Be it known that I, MARTIN KENNEDY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Dies for Coupling-Links, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

10 Figure 1 represents an inside elevation of one part of a two-part die embodying my improvement, which part may be called the "female die," Fig. 2, a similar view of the other part of the die, which may be called the "male die;" Fig. 3, a sectional view of the same put together and the die-punch in position; Fig. 4, an elevation of the male die and die-punch in position for operation; Fig. 5, a plan of the link bent and with its ends overlapped ready 20 for placing in the dies; Fig. 6, an edge view of the same; Fig. 7, a plan of the finished link as forged in the dies, and Fig. 8 an edge view of the same.

My invention relates to dies for the forging 25 of coupling-links for cars, the object being to provide dies which will produce an improved link, satisfactory in finish, and as strong, if not stronger, at the welded end as at any other portion of the link.

30 The invention consists in two-part dies adapted to inclose the link, and provided one part with a recess in its face and the other with a corresponding projection, whereby a firm support is provided for the forging and 35 welding of the overlapped ends of the link by the operation of the two dies and a die-punch, adapted to operate in connection therewith.

I will proceed to describe one mode of carrying out my invention in practical form, and 40 will then point out definitely in claims the special improvements which I believe to be new and wish to protect by Letters Patent.

In the drawings, A represents the female 45 portion of the die, and B the male, and they are constructed in the usual way of similar inclosing-dies in most parts. They are made so that each will represent one-half of the complete die nearly their entire length, the 50 only exception being at the extreme end, as

will be described presently. The female member A is provided with circular grooves or channels  $a$  on each side adapted to receive one-half of the link, and a central core  $a'$  rises between them, which constitutes one-half of 55 the complete core of the entire die. This core-section  $a'$  extends somewhat beyond the outer edges  $a^2$  of the grooves, as seen in Fig. 1 of the drawings, but terminates before it reaches the proper length of the core for the 60 links which are to be made; and beyond it is a recess  $a^3$ , the extremity of which is circular, while the sides are straight and about in line with the sides of the core-section. The male member B is similarly constructed, being provided with like grooves  $b$  and a core-section  $b'$  and outer edges  $b^2$ ; but instead of a depression at the end of this core-section 65 it is provided with a stud or projection  $b^3$ , which is adapted to fit into the recess  $a^3$  in 70 the corresponding member A. Preferably this projection is slightly rounded or beveled at its extremity, as seen in Fig. 2 of the drawings, which is simply to facilitate its 75 entry into the aforesaid recess when the two parts of the die are brought together, as seen in Fig. 3 of the drawings. It will be seen that when the two parts of the die are brought together in this way, as shown in Fig. 3 of the drawings, there will be provided 80 at the end a stiff solid projection around which the end of the link is to be forged and welded, and that there is no dividing-line at this point in the plane of the link. The two parts of the die are cut away from the terminals of the outer edges of the grooves back 85 past the recess and projection, and from there entirely across to the outer ends of the blocks, so that the plane of these two opposite faces will correspond to the bottom of the grooves in 90 each. It will be seen then that when brought together there will be a clean open space between the ends of the two members and inward past the stud or projection  $b^3$  up to the 95 ends of the side edges of the grooves, which edges of course meet when the two parts are brought together. This space is of course in width about the thickness of the links. A die-punch C is constructed of such dimensions as to enter and fit this open space be- 100

tween the two extremities of the two parts of the die. The extremity of this punch is recessed, the concavity  $c$  being of a shape to correspond with that required for the end of the coupling-link. This circular recess in the end of the punch will therefore be concave in cross-section, as shown in Fig. 3 of the drawings, and preferably a shallow groove  $c'$  is made at the bottom of the recess about midway of the cross-section and running nearly around the recess, though, preferably, it is run out some little distance back from the extreme points of the punch. This die-punch is fastened at its other end to a suitable plunger D, by means of which it is given a reciprocating motion by any suitable mechanism.

These dies are intended to form and weld the open ends of partly-made links. The links are partly formed by bending the link-bar or iron into the general shape of the links and overlapping the ends, as will be presently described; and this open link is then placed in the die so that the end where the lap is will slip over the projection on the male member, the slight taper or bevel given to this part being also for the purpose of facilitating this adjustment of the link. The two parts of the inclosing-die are then brought together by the forging-machine and the die-punch is driven in between the open and plane-faced ends of the two parts of the die, as shown in Figs. 3 and 4 of the drawings. The movement of this punch is inward to the ends of the meeting side edges  $a^1b^2$ , against which it abuts on each side. It will be seen that this movement of the punch will force its forks inward over and along upon the sides of the lapped ends of the link, thus forging and welding these ends together and upsetting the metal as the punch moves inward, thus causing it to completely fill the space between the punch and the two parts of the die. There is also provision for making the welded end somewhat larger than the rest of the link. This is accomplished by constructing the punch so that when it is moved inward to its fullest extent, as shown in dotted lines in Fig. 4 of the drawings, the space between the punch and the core of the die will be somewhat larger than the regular size of the link, which is represented by the side grooves in the inclosing-die. This difference is illustrated in Fig. 4 of the drawings.

The links are prepared for the operation of these dies by first bending so as to form a link E, as shown in Figs. 5 and 6 of the drawings, with the ends  $e$  considerably overlapped, as shown in these two figures. The link thus bent is then placed in the male member of the inclosing-die, the lapped ends being slipped over the rounded projection, as already described, and the two parts of this die are pressed together by the operation of any suitable machine. It will be seen that the overlapping ends provide an increased amount of metal, which is intended to be sufficient to

make this welded end of the link larger than the other, as already mentioned. When the inclosing-dies are forced together, as described, and the die-punch is then driven inward, as already mentioned, it will forge the overlapped ends of the link into proper shape and will at the same time weld them thoroughly together, and in its movement will upset the metal, driving it inward, and so distributing it evenly all along the bend of the link practically to the point where the end of the punch meets the outer edges of the side grooves. This will make a completed link F, as shown in Figs. 7 and 8, in which it will be seen that the welded end  $f$  is perfectly formed, but at the same time is somewhat larger than the rest of the link, and is also provided with a small rib  $f'$ . There is no fin whatever on the inside of this forged end of the link, the solid projection  $b^3$  entirely preventing this defect. The little rib on the exterior of the link is for the purpose of giving some additional strength, but is not an essential feature and of no great importance. It also serves to take up any slight surplus of metal. I am thus enabled to produce a link thoroughly welded at the lapping ends and having an increased amount of metal, so that it is comparatively stronger than other parts of the link.

In coupling-links as heretofore made the breakage, whenever it occurs, is almost invariably at the welded end; but in links made with the forging devices herein described it has been found by actual and repeated tests that the link will part at other points or at the other end, rather than at the welded end. By the upsetting operation of the punch the scar of the weld-lap is completely hidden, so that the link is not only improved in strength and durability, but also in appearance. It is impossible to make a link of this shape in any old way. If the link is forged in two-part dies, which are made so as to complete the die when joined together, or if it is made under the hammer, it is impossible to distribute the metal, as herein shown, so as to give increased strength entirely around the bend. The increase will practically stop at the end of the lap. It is the upsetting operation which enables me to form the link shaped as herein shown and described.

I have not attempted to show and describe a machine for operating the dies and punch, as it does not constitute any part of my present invention.

Any forging-machine adapted to give the required movement to the parts, as herein set forth, will answer the purpose. The machine shown and described in my prior patent, No. 379,474, dated March 13, 1888, is suitable for this purpose with slight adaptation; but any other machine adapted to operate the dies and punch, as described, may be employed.

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

1. In dies for forging coupling-links, a two-part inclosing-die consisting of the two members A and B, provided with the side grooves  $a$ ,  $b$ , the outer edges of which terminate some distance from the turning end of the die and having their faces planed down from said points of termination even with the bottom of said grooves, substantially as and for the purposes specified.

5 2. A two-part inclosing-die for forging coupling-links, composed of the female member A, having side grooves  $a$ , a portion of the central core  $a'$ , a recess  $a''$ , in combination with the male member B, provided with similar grooves and core, and a stud or projection  $b''$  at the end of the core, substantially as and for the purposes specified.

10 3. The two-part inclosing-die for forging coupling-links, consisting of the two members A and B, constructed to form the side grooves 20 and central core for the link when placed together and having the outer edges  $a'$  and  $b'$  of the said grooves terminating some distance from the end of the core and with their faces planed down to the depth of the grooves outward therefrom, in combination with a die-punch C, having a concavity  $c$  in its end conforming to the required shape of the link and adapted to pass in, around, and alongside of the central core of the die, substantially as 25 and for the purposes specified.

15

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