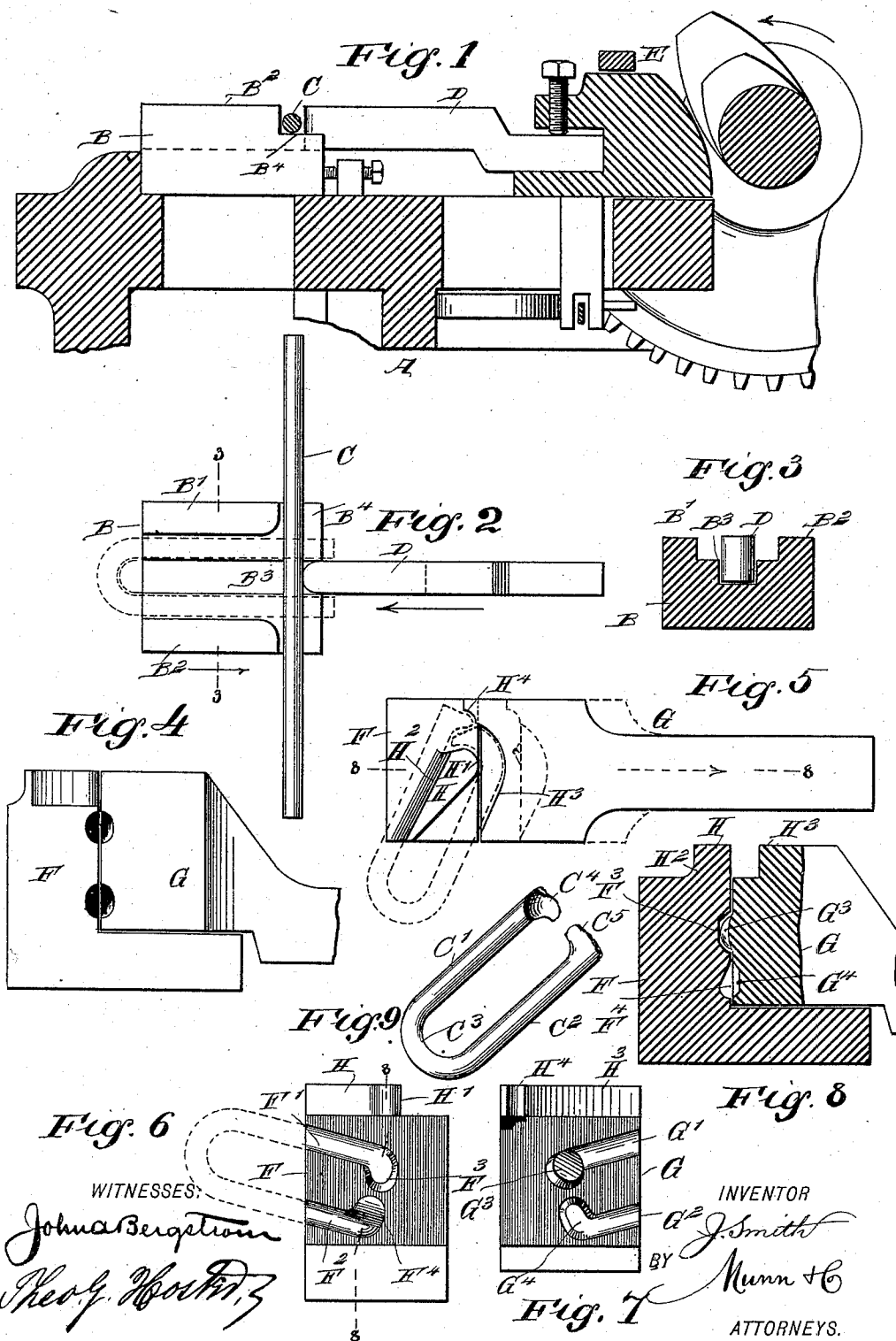


J. SMITH.
DIE FOR MANUFACTURE OF LINKS.

No. 535,301.

Patented Mar. 5, 1895.



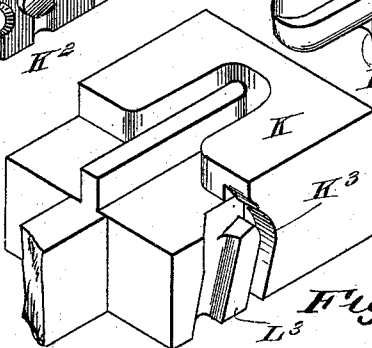
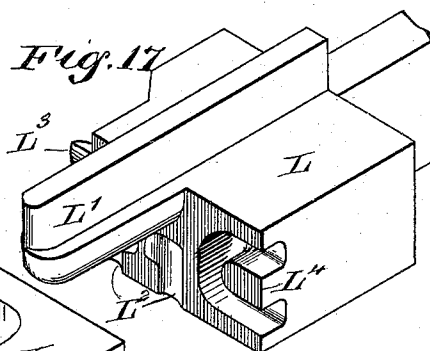
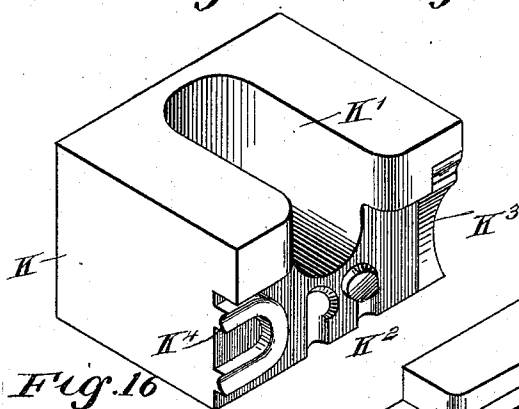
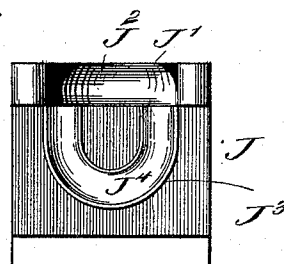
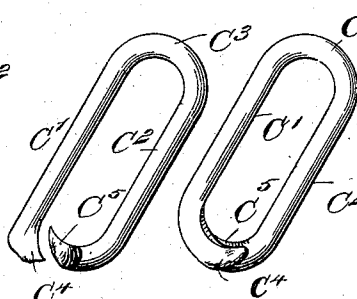
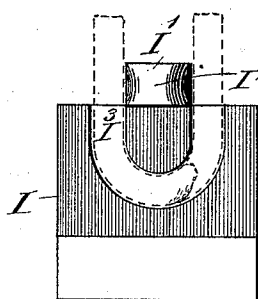
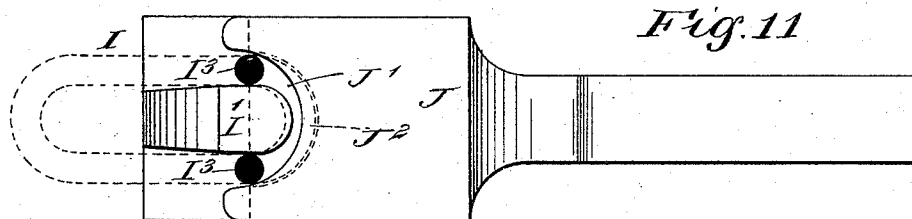
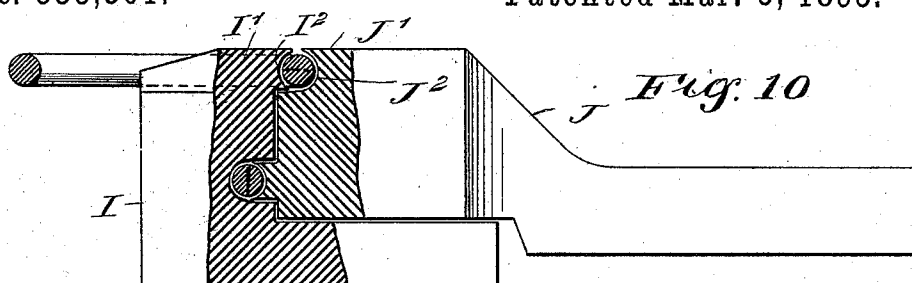
(No Model.)

2 Sheets—Sheet 2.

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WITNESSES:

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UNITED STATES PATENT OFFICE.

JOSEPH SMITH, OF PUEBLA, MEXICO, ASSIGNOR OF ONE-HALF TO JOHN HENRY EBERT, OF SAME PLACE.

DIE FOR MANUFACTURE OF LINKS.

SPECIFICATION forming part of Letters Patent No. 535,301, dated March 5, 1895.

Application filed April 21, 1894. Serial No. 508,489. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH SMITH, of Puebla, in the State of Puebla, Mexico, have invented certain new and useful Improvements in Dies for the Manufacture of Links, of which the following is a full, clear, and exact description.

The object of the invention is to provide certain new and useful improvements in the manufacture of links used for coupling railroad cars and for other purposes, and whereby links can be very cheaply produced.

The invention consists of sets of dies for successively bending, swaging, overlapping and welding the iron to form the link.

The invention also consists of certain parts and details, and combinations of the same, as will be hereinafter described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the dies for bending the rod and means for operating the said dies, the means being shown in section. Fig. 2 is a plan view of the dies for bending the rod. Fig. 3 is a transverse section of the female die, on the line 3—3 of Fig. 2. Fig. 4 is a side elevation of the dies for swaging and overlapping the ends of the bent rod. Fig. 5 is a plan view of the same. Fig. 6 is an inner face view of the female die of the said swaging and overlapping dies. Fig. 7 is a similar view of the male swaging and overlapping die. Fig. 8 is a sectional side elevation of the swaging and overlapping dies, on the line 8—8 of Figs. 5 and 6. Fig. 9 is a plan view of the link after swaging the ends. Fig. 10 is a sectional side elevation of the welding dies. Fig. 11 is a plan view of the same. Fig. 12 is an inner face view of the female welding die. Fig. 13 is a similar view of the male welding die. Figs. 14 and 15 are perspective views of the link before and after overlapping the ends. Fig. 16 is a perspective view of the female dies assembled in one piece. Fig. 17 is a similar view of a male die in which all the male dies are assembled in one piece; and Fig. 18 is a similar view of the dies shown

in Figs. 16 and 17, in position and with parts broken out.

As shown in the drawings, the individual dies for bending the rod, swaging and overlapping and welding the same may be in separate sets, as shown in Figs. 1 to 13, inclusive, or the dies may be assembled in two pieces of which one carries all the female dies; see Fig. 16; and the other carries all the male dies, as shown in Fig. 17. As shown in Fig. 1, a bolt heading machine A of any approved construction carries a female die B fastened in place by a set screw or other suitable means, the said female die being formed on its top surface with two longitudinally-extending ridges B' and B², slightly rounded at their inner corners, as plainly shown in Fig. 2.

In the top surface of the female die B and in the middle thereof is arranged the longitudinally-extending groove B³, the upper edges of which are a suitable distance from the inner walls of the ridges B' and B², the said distance corresponding to the diameter or thickness of the rod C, to be formed into a link. The inner ends of the ridges B' and B² terminate a suitable distance from the inner end of the die, so as to form a seat B⁴ on which the rod C is placed, the latter abutting against the inner ends of the said ridges B' and B².

In the groove B³ reciprocates the male die D having a forward rounded semi-circular end and connected at its rear end with a suitable reciprocating mechanism E of the machine A, so as to move the male die forward and backward in the groove B to about the height of the ridges B' and B². Now, when the rod C is in position, as shown in Figs. 1 and 2, and a reciprocating motion is given to the male die D, then the forward end of the latter engages the middle of the link C and forces the same inward so as to bend the rod into a U-shape having side members C' and C², and the rounded portion C³, as indicated in dotted lines in Fig. 2, and also shown in Fig. 9.

When the rod has been bent in this manner, then the male die D moves outward and the bent rod is then removed from the female die B to be next treated in the swaging dies

F and G for forming lips C^4 and C^5 on the sides C' and C^2 of the bent link. The female swaging die F is formed on its inner face with the recesses or grooves F' and F^2 arranged parallel to each other and slightly inclined upwardly, as plainly shown in Fig. 6, the said grooves being placed a distance apart corresponding to the distance between the sides C' and C^2 of the link to be formed. The inner end of the groove F' terminates in an enlargement F^3 having bevel sides and extending toward the inner end of the groove F^2 , the said groove F^2 terminating at its inner end in a bevel F^4 extending toward the enlargement F^3 , as shown in Fig. 6.

The inner face of the male die G is likewise provided with a groove G' arranged opposite the groove F' when the two dies move together and also provided with a groove G^2 in alignment with the groove F^2 . The inner end of the groove G' in the male die G terminates in a bevel offset G^3 and the inner end of the groove G^2 terminates in an enlargement G^4 having bevel sides. See Fig. 7. Now, when the dies are apart, then the bent rod C is placed with its sides C' and C^2 into the grooves F' and F^2 , as indicated in dotted lines in Fig. 6, so that the ends of the sides are at the inner ends of the grooves F' and F^2 , and when the male die G now moves inward toward the fixed female die F, then the ends of the sides C' and C^2 are pressed or swaged on by the offset G^3 and the bevel F^4 , so as to form the lips C^4 and C^5 on the ends of the sides C' and C^2 , as illustrated in Fig. 9. When the die G recedes then the link having swaged lips is removed from the female die, and is then treated to a set of dies for overlapping the lip ends of the link, as illustrated in Fig. 5. This set of dies is preferably formed on the dies F and G and on the top of the same, and for this purpose the die F is provided on its top with a wedge-shaped projection H arranged obliquely and having its inner end H' rounded off while its outer side H^2 is curved as plainly indicated in Figs. 5 and 8.

On the top of the male die G is formed a curved shoulder H^3 terminating in a second shoulder H^4 adapted to form an abutment for the respective lip C^4 or C^5 . Now, after the lips have been formed in the dies F and G, then the link is placed upon the top of the female die F so that one side C' rests against the bevel side H^2 of the projection H, while the other side C^2 rests against the rounded end H' and projects beyond the face of the die F. Now, when the male die G moves inward, then the shoulder H^3 engages the free end of the side C^2 and bends the same inward around the rounded end H' of the projection H as indicated in dotted lines in Fig. 5. When this has been done, and the die G moves outward, then the link is removed and reversed so that the side C^2 rests against the curved side H^2 of the projection H and the side C' projects beyond the face of the die F to be engaged by the then inwardly-moving male die

G to be bent over the rounded end H' , so as to overlap the bent part of the side C' , as plainly illustrated in Fig. 15.

It will be seen that the lips C^4 and C^5 by this process, are caused to properly overlap so that the link is now closed at both ends and the overlapped end is ready for welding. Previous to being welded, however, it is desirable to round as much as possible, the swaged overlapped lips C^4 and C^5 , and for this purpose, the welding dies I and J shown in Figs. 10, 11, 12 and 13, are formed with dies for the purpose mentioned.

The female die I is provided on its top with a longitudinally-extending projection I' formed at its inner end with an approximately semi-circular groove I^2 and on the top of the male die J is formed a semi-circular projection J' formed with an approximately semi-circular groove J^2 in its face, as plainly shown in the figures referred to. The width of the projection I' corresponds to the distance between the sides C' and C^2 of the link, and when the latter is placed over the said projection with the overlapping lips C^4 and C^5 abutting in the groove I^2 , and the male die J is moved inward then the shoulder J' with its groove J^2 , engages and presses the overlapped lips C^4 and C^5 onto the projection I' , whereby the said overlapped lips are smoothed and rounded off so that the link at this end presents a uniform circular cross section. The link thus formed is now swaged in the dies I and J, and for this purpose the die I is formed in its face with a semi-circular recess or groove I^3 adapted to receive the rounded overlapped end of the link, as indicated in dotted lines in Fig. 12. The inner ends of this groove I^3 terminate in the top face of the die I on opposite sides of the projection I' , as plainly shown in Figs. 11 and 12.

On the inner face of the male die J is arranged a semi-circular projection J^3 formed with a semi-circular groove J^4 and located directly opposite the groove I^3 in the female die I. Now, when the link is placed in position in the said groove I^3 , as shown in Fig. 12, and the male die J moves inward, then the overlapped lips C^4 and C^5 are swaged by the action of the projection J^3 on the male die J. By this last step in the process the link is finished. Thus, it will be seen that by successively treating the rod C in the manner described, a link of great durability and strength is produced in a very cheap and economical manner.

As illustrated in Figs. 16, 17 and 18, the dies K and L contain all the separate dies above mentioned, that is to say, the die K contains the female die K' corresponding to the die G, the male die K^3 corresponding to the shoulder H^3 for bending the ends of the sides of the rod after swaging and the male die K^4 for finally swaging the link and corresponding to the male die J. The die L is provided with the male die L' corresponding to the die D, the female die L^2 corresponding to

the die F for swaging, the die L³ corresponding to the projection H for bending, and the die L⁴ for welding finally the link, and corresponding to the female die I. By using these
 5 two dies K and L only, the above described process is repeated for forming the rod C into a link, the rod being successively treated in the several dies for bending, swaging to form the lips, overlapping the lips, rounding the
 10 overlapped ends and finally welding the latter, as above described.

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

15 1. In the manufacture of links, a set of dies for bending the iron into U-shape and comprising a female die formed with two longitudinally extending ridges, and a longitudinal groove formed centrally between the ridges,
 20 the distance on each side between the edge of the central groove and the inner wall of the ridge corresponding to the diameter of the rod to be formed into a link, and a male die adapted to reciprocate in the said central longitudinal groove, substantially as shown and
 25 described.

2. In the manufacture of links, a set of swaging dies comprising a female die formed in its face with grooves F' F², the groove F'
 30 terminating at its inner end in an enlargement F³ having bevel sides and the groove F²

terminating in a bevel F⁴, and a male die formed in its inner face with grooves G' G², the groove G' terminating in an offset G³ and the groove G² in an enlargement G⁴ having
 35 bevel sides, substantially as shown and described.

3. In the manufacture of links, a set of bending dies comprising a female die having a projection H formed with a rounded end H',
 40 and a male die having a curved shoulder H³ terminating in an abutment H⁴, substantially as shown and described.

4. The combination with a female die provided with a longitudinal projection, the front
 45 face of which extends beyond the inner or front face of the die and is provided with a semi-circular groove, the said die being further provided with a semicircular groove in its inner or front face, of a male die having a
 50 semi-circular shoulder grooved at the inner face, the ends of the said shoulder extending beyond the inner or front face of the die, and a semi-circular projection formed on the inner or front face of the said die and provided
 55 with a semi-circular groove in its face, substantially as shown and described.

JOSEPH SMITH.

Witnesses:

C. H. ELEY AGRAMONT,
 JAMES W. PORCH.