(No Model.) 2 Sheets—Sheet 1.

C. H. WILLIAMS.

MACHINE FOR MAKING LINKS.

No. 303,244. Patented Aug. 5, 1884.

Fig. 1

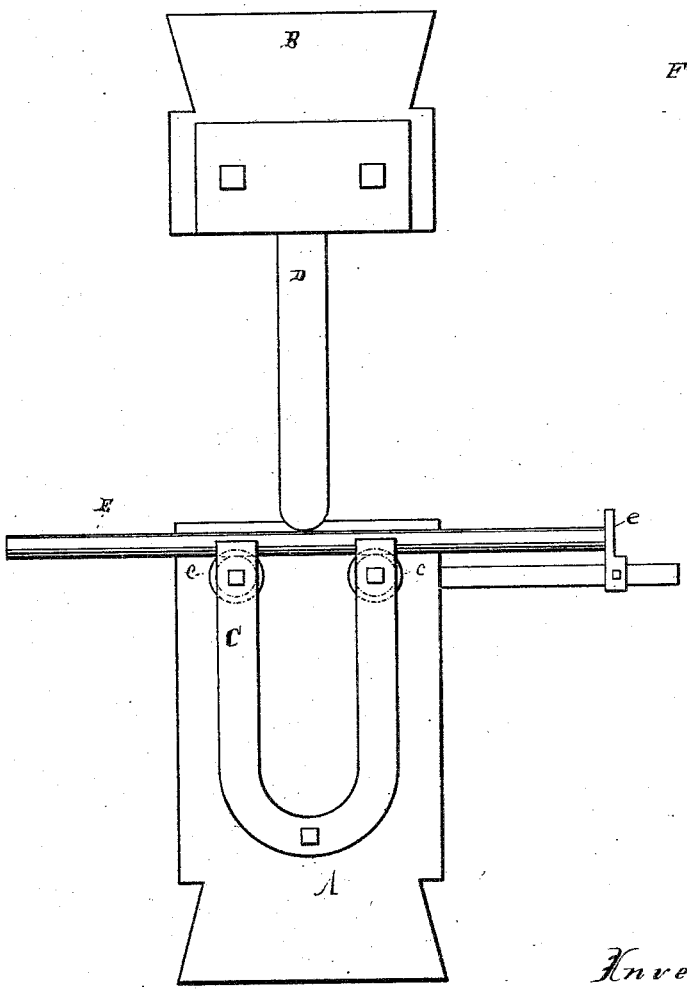


Fig. 2

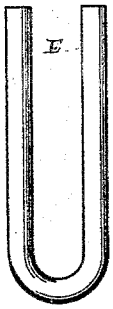


Fig. 3

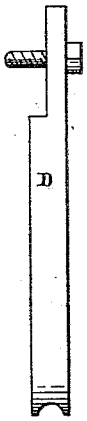
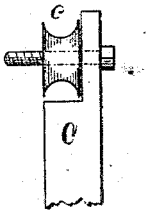


Fig. 4



Attest:

Alfred B. Benedict

Jacob J. Gessert

Inventor:

Charles H. Williams

By Geo. J. Murray Atty

(No Model.) 2 Sheets—Sheet 2.

C. H. WILLIAMS.

MACHINE FOR MAKING LINKS.

No. 303,244. Patented Aug. 5, 1884.

Fig. 7

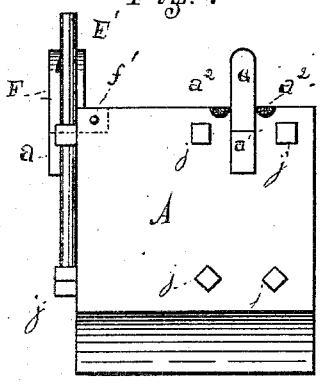


Fig. 6

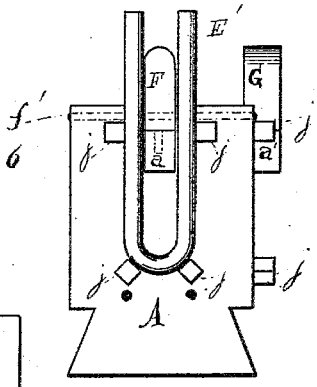


Fig. 5

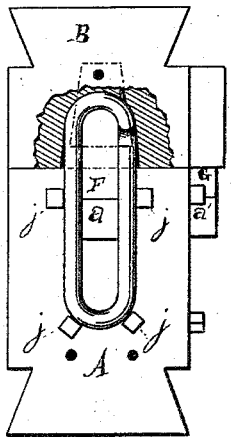


Fig. 9

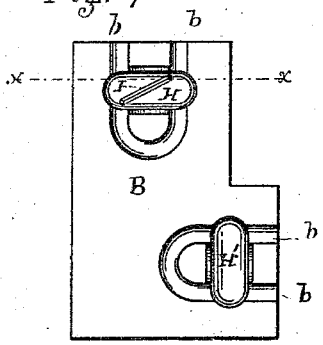
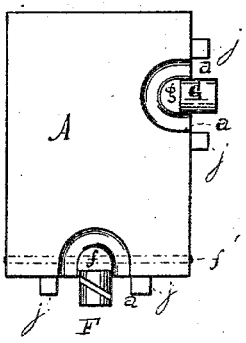


Fig. 8



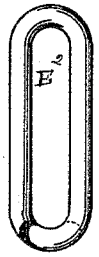


Fig. 10

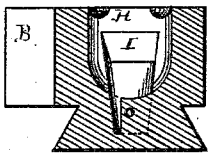


Fig. 11

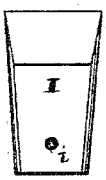
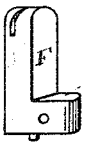


Fig. 12

Fig. 13



Attest:

Alfred B. Benedict

Jacob J. Gessert

Inventor.

Charles H. Williams

By Geo. J. Murray Atty

UNITED STATES PATENT OFFICE.

CHARLES H. WILLIAMS, OF CINCINNATI, OHIO.

MACHINE FOR MAKING LINKS.

SPECIFICATION forming part of Letters Patent No. 303,244, dated August 5, 1884.

Application filed April 24, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. WILLIAMS, a citizen of the United States, residing at Cincinnati, county of Hamilton, State of Ohio, have invented certain new and useful improvements in the process and mechanism for bending, upsetting, scarfing, and welding links for railway-couplings, chains, &c., of which the following is a specification.

The object of my invention is to rapidly and perfectly form and lap-weld coupling-links at one welding-heat.

With these objects in view my invention consists in a peculiar arrangement of mechanism by which I am enabled to successively form the link with overlapping scarfed ends, leaving the jointing edges smooth and clean, and upsetting and then welding the overlapping ends together, making a perfect weld and enlarged end upon the link for greater strength, all of which will be first fully described in connection with the accompanying drawings, and particularly pointed out in the claims.

Referring to the drawings, in which similar reference-letters indicate like parts wherever they occur throughout the various views, Figure 1 is a front elevation of the devices for bending a bar of proper length into a U-shaped link-blank such as represented in Fig. 2. Fig. 3 is an edge view of the plunger or male die. Fig. 4 is an edge view of the upper ends of the U-shaped lower or female die. Fig. 5 is a front elevation of the dies for turning down, scarfing, and upsetting the ends of the U-shaped blank preparatory to welding, a portion of the upper die being broken away to expose the end of the bent and scarfed link within the die and the position of the scarfing-blade when the dies are brought together. Fig. 6 is a similar view of the lower die with the upper die removed. Fig. 7 is an elevation of the lower die, taken at right angles to the view represented in Fig. 6. Fig. 8 is a top plan view of the lower die. Fig. 9 is an inverted plan view of the upper die. Fig. 10 is a vertical section of the upper die through line *x x* of Fig. 9, with the bent and scarfed link withdrawn from the die. Fig. 11 is a side elevation of the scarfing-blade enlarged. Fig. 12 is an enlarged end elevation of the scarfed link, the opening separating the ends being exaggerated. Fig. 13 is a perspective view of the grooved link-horn of the lower die, which receives and steadies the scarfing-blade when the end of the link is scarfed and upset.

The blocks A and B are of cast metal, and have dovetailed ends for convenience in attaching them to steam or drop hammers or other suitable swaging or forming presses or tools. The block A is secured in the anvil of the hammer, and the block B is carried by the plunger. On one side of the block A is secured a U-shaped piece, C, which has grooved friction-rollers *c* in its upper ends. To the upper block, B, is secured a piece, D, to pass down into the piece C when the plunger of the hammer descends, leaving a space between the two pieces equal to the diameter of the rod E, from which the U-shaped blank E′, Fig. 2, is formed. A rod, E, of proper length, being placed upon the friction-rolls *c*, with its end against a gage, *e*, which is adjustable along a bar secured in a block, A, to stop the bar E with its center vertically under the grooved end of the downwardly-projecting horn D, a descending stroke of the plunger forces the rod E into the piece C, forming the U-shaped link-blank E′, Fig. 2.

The pieces C and D are secured upon the side of the blocks A and B opposite the scarfing and upsetting dies, and may be left permanently in place, so that the operations of bending the blanks and finishing the links may proceed simultaneously; but, for convenience, I prefer to first bend the requisite number of link-blanks. I then detach the bending devices and proceed with the operation of finishing the link, which operation I will now describe.

The block A has cast with it two projecting studs, *a a′*, and the block has U-shaped recesses cast in it from the top down to the top of these studs *a a′*, to receive the laterally-projected ends *f g* of the link-horns F and G, (which horns are alike in shape, except that the upper end of the horn F has a diagonal slot or groove, to receive and steady the scarfing-blade of the upper die,) which snugly fit into these recesses, and are firmly retained in place by dowel-pins projecting down from the pieces F and G into holes in the studs *a a′* and rods *f′ g′*, passing transversely through block A and holes in the lateral projections of the horns F G. The face of the block A has depressions a^2 a^2 around the recesses which receive the

horns F and G, which depressions are semicircular in cross-section to half embed the link end. The inner rounded end of the projections *f g* of the horns, being the inner walls of the recesses, are of the same shape as the upper rounded end of the horns. The upper die, B, has also depressions *b b*, similar to the depressions in the lower die, and arranged to come opposite them. These recesses *b* extend out to the overhanging edges of the block. The block B has also recesses H H′, to receive the horns F G. The recess H is large enough to leave a space between its walls and the horn F, to receive the scarfed end of the link-blank E^2, Figs. 10 and 12, while the recess H′ need only be large enough to receive the horn G, incumbered with the welded link. The mouths of both recesses flare, so as to insure the entrance of the link ends.

Within the recess H is placed a thin blade, I, which extends diagonally across the recess, dividing it into two compartments. The recess has a depression at its bottom, to receive the end of the blade, which is held in place by a set-screw, which passes from the outside of block B into a depression, *i*, in the blade. The blade is beveled to an edge, to guide it into the diagonal slot in the upper end of the horn F.

The sides of the block A have tapped perforations, to receive square-headed screws *j*, which steady the blank while it is being operated upon. There may be a series of these holes, as shown in Figs. 5 and 6, so that the lower screws may be changed to make links of different lengths.

The pieces C D, horns F G, and blade or partition I are, for strength, made of steel.

The blocks A and B being properly secured in place, and the plunger of the hammer, with block B, at the upper limit of its stroke, a blank, E′, having its ends which are to be turned over brought to a welding-heat, is placed on the block A in the position shown in Fig. 6. The upper die is then brought down, as seen in Fig. 5, turning over, upsetting, and scarfing the ends, forming the blank E^2, as seen in Figs. 10 and 12. The operator now grasps the blank with his tongs between the lower screws, *j*, and, so soon as the block B is elevated, turns the scarfed end down in the depression a^2. Another stroke of the hammer closes the end of the link and welds the scarfed surfaces firmly together. The link is now completed, except a burr formed by forcing the surplus metal (and it is best to have a surplus) between the meeting surfaces of the dies. To smooth off this burr and finish the link, it is placed on the horn G and subjected to the action of the hammer again. The top of the horn G being plain, instead of grooved, flattens the inner curve of the link and gives a better bearing for the coupling-pin.

To provide for upsetting the welded end of the link and making it heavier than the other parts, the blank E′ is made a little longer than those used commonly for coupling-links. When the ends of the links are upset and lap-turned, the adjacent edges are smooth and clean, and as the operation of welding takes place immediately, the meeting surfaces have no chance to become oxidized. A perfect weld is thus formed, which is very difficult, if not impossible, when the joining surfaces require heating after being scarfed.

As the purpose of the diagonal slot or groove in the horn F is simply to steady the scarfer while the welding-surfaces are upset against it, it is evident that it could be dispensed with by making the horizontal edge of the blade conform to the shape of the top of the horn F and letting its vertical edges into grooves in the vertical sides of the recess H.

What I claim as new, and desire to secure by Letters Patent, is—

1. A die for bending down, scarfing, and upsetting the ends of links, having a recess, as H, divided by a partition, against which the opposite scarfed ends are upset, in combination with suitable devices to hold the link-blank during the operation, substantially as specified.

2. The combination, substantially as specified, of the block B, having the recess H, and the blade I, diagonally secured within said recess, with the block A, having the diagonally-slotted link-horn F projecting from it, and suitable means, as screws *j*, to retain the link-blank in position.

3. The combination, substantially as specified, of the block A, having the depression a^2 and link-horn F, and link-retaining devices *j*, with block B, having depression *b*, corresponding to depression a^2 in block A, and recess H, diagonally divided by blade I, for the purpose of lap-turning, scarfing, upsetting, and welding links at one welding-heat.

4. The combination, substantially as specified, of the blocks A B, having recess H, blade I, horn F and depressions a^2 *b*, and screws *j*, for lap-bending, scarfing, upsetting, and welding the link, with recess H′ and horn G, for finishing the welded link.

5. The combination of block A, provided with U-shaped piece C, horns F and G, recesses a^2, and gage *e*, with block B, having piece D, recess H, having a scarfing-blade, and recesses H and *b b*, all arranged and operating substantially as and for the purpose set forth.

6. In combination with a steam-hammer or other suitable forming or swaging press or tool, the swage-blocks A B, said block A having depression a^2, horn F, and screws *j*, for holding a U-shaped link-blank, and the block B having a partitioned recess, H, and depressions *b*, said block so formed and combined for the purpose of lap-turning, scarfing, upsetting, and welding a link at one welding-heat, as specified.

CHARLES H. WILLIAMS.

Witnesses:
JACOB J. GESSERT,
GEO. J. MURRAY.