

(No Model.)

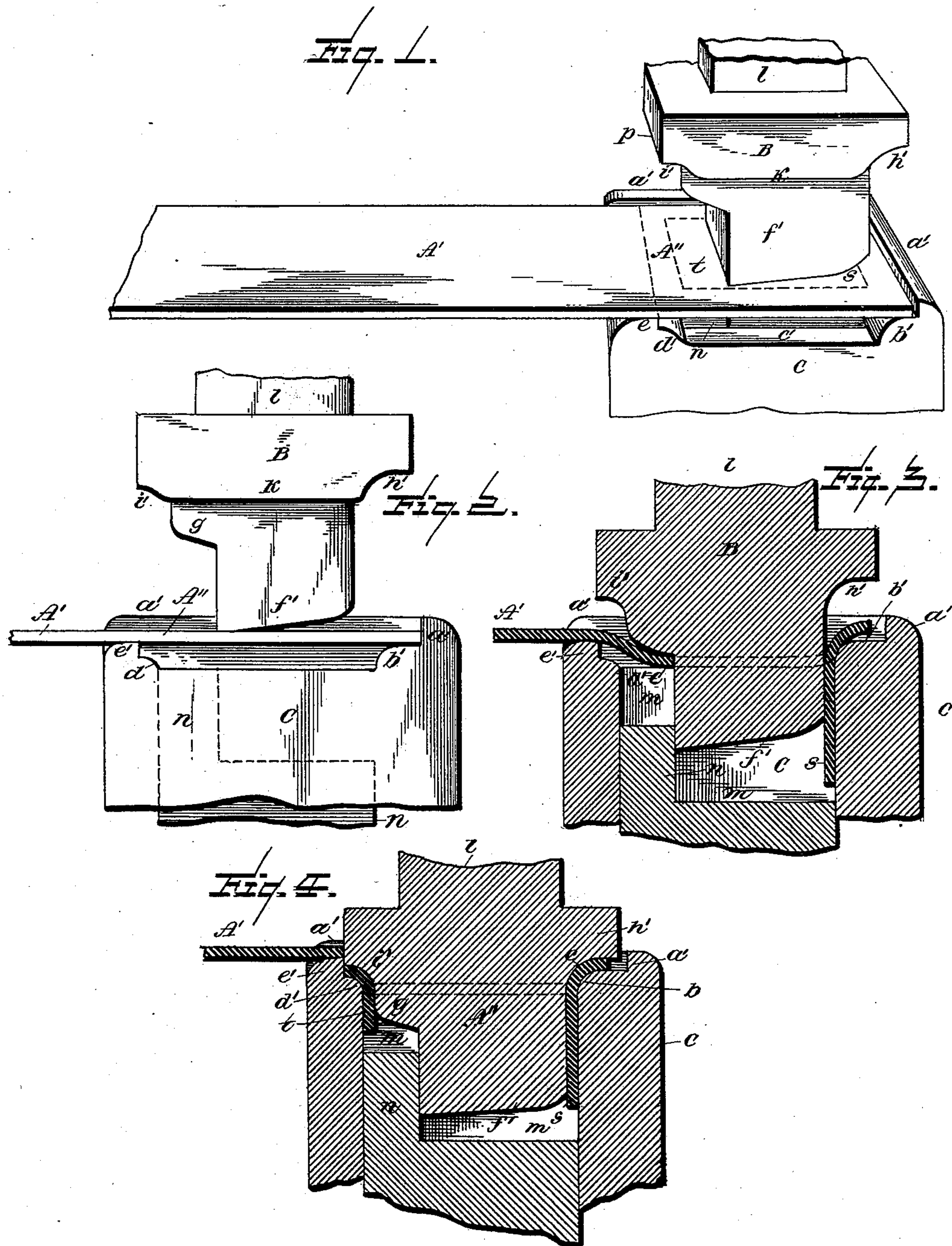
2 Sheets—Sheet 1.

S. D. LOCKE.

DIE FOR MAKING DRIVE CHAINS.

No. 393,913.

Patented Dec. 4, 1888.



Witnesses:
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W. S. Durall

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 5.

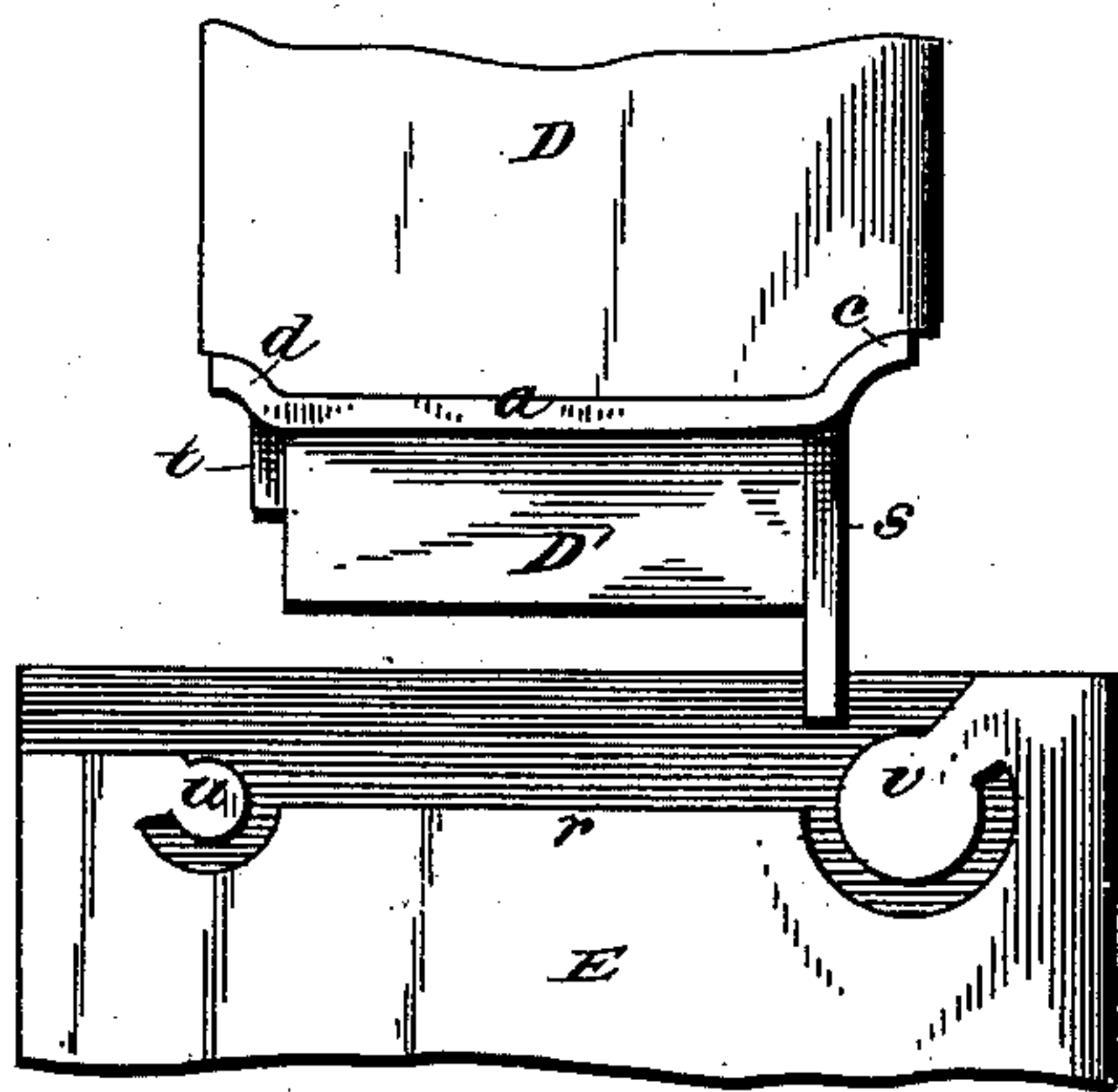


Fig. 6.

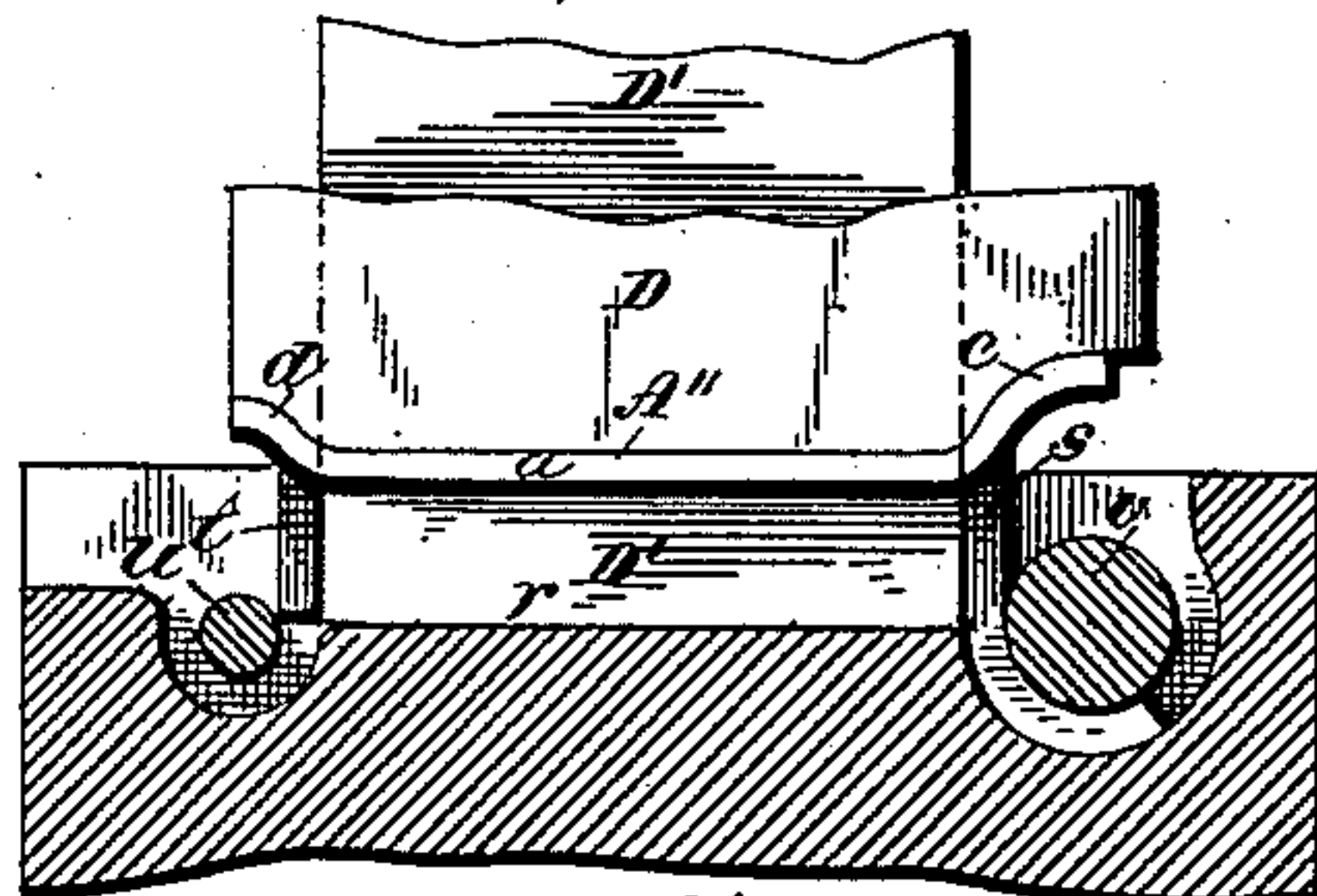


Fig. 7.

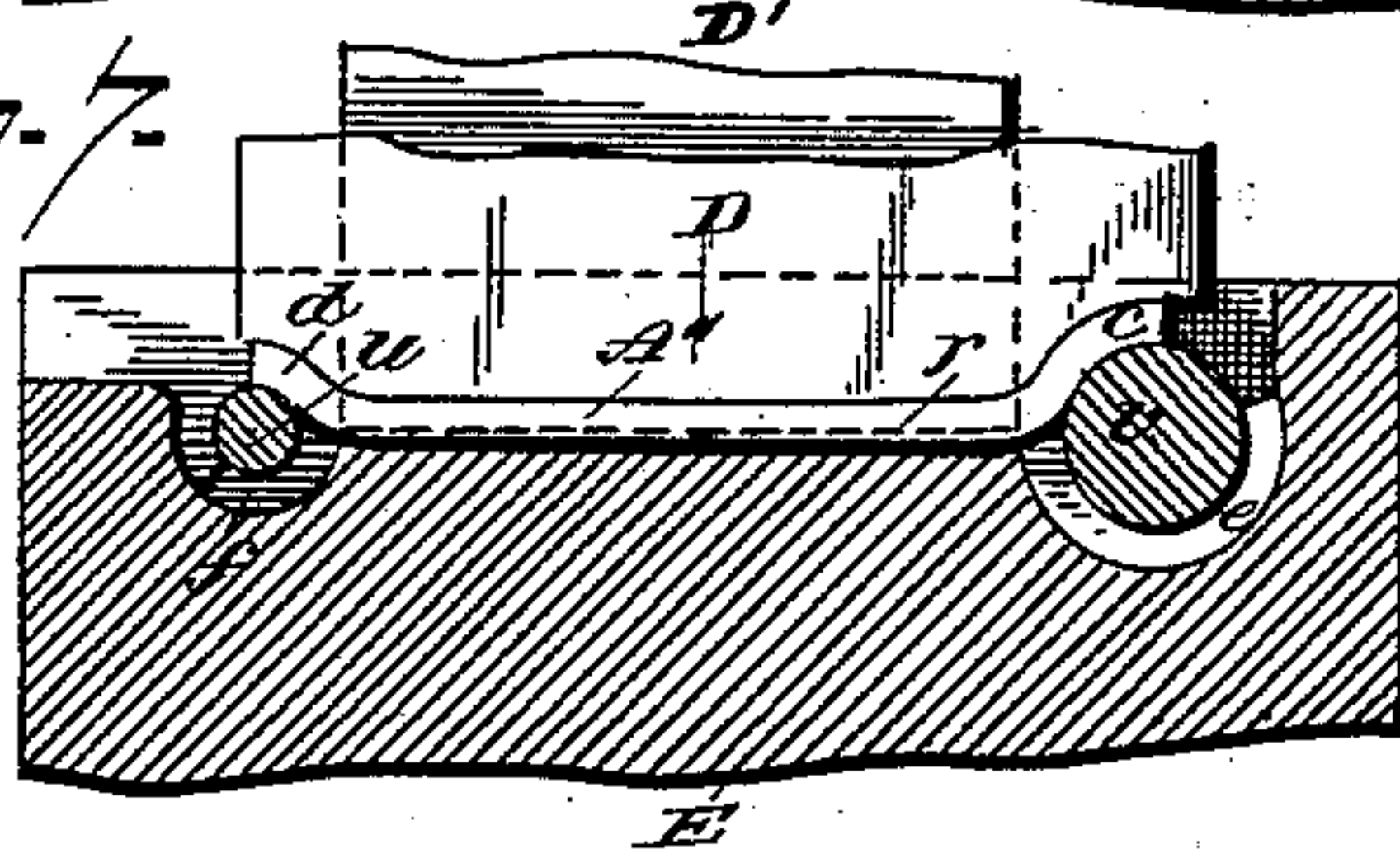


Fig. 8.

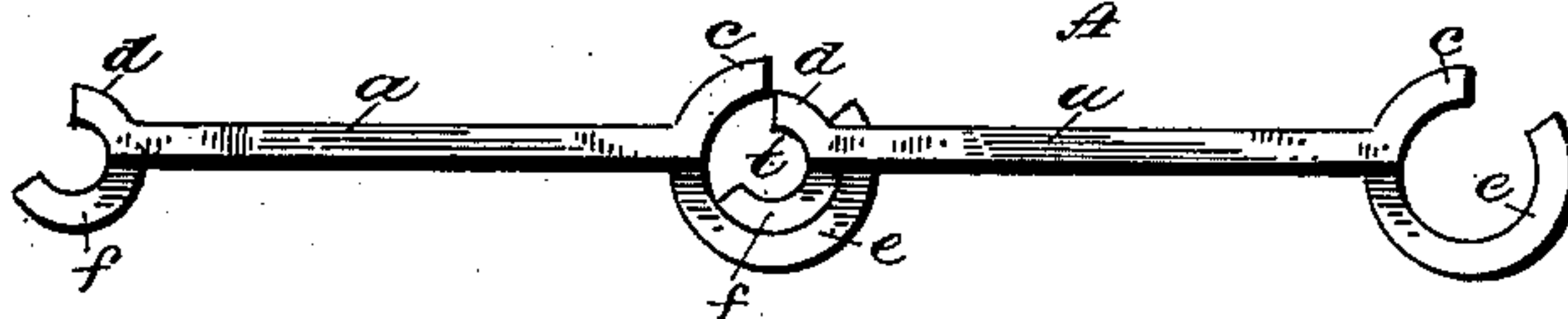
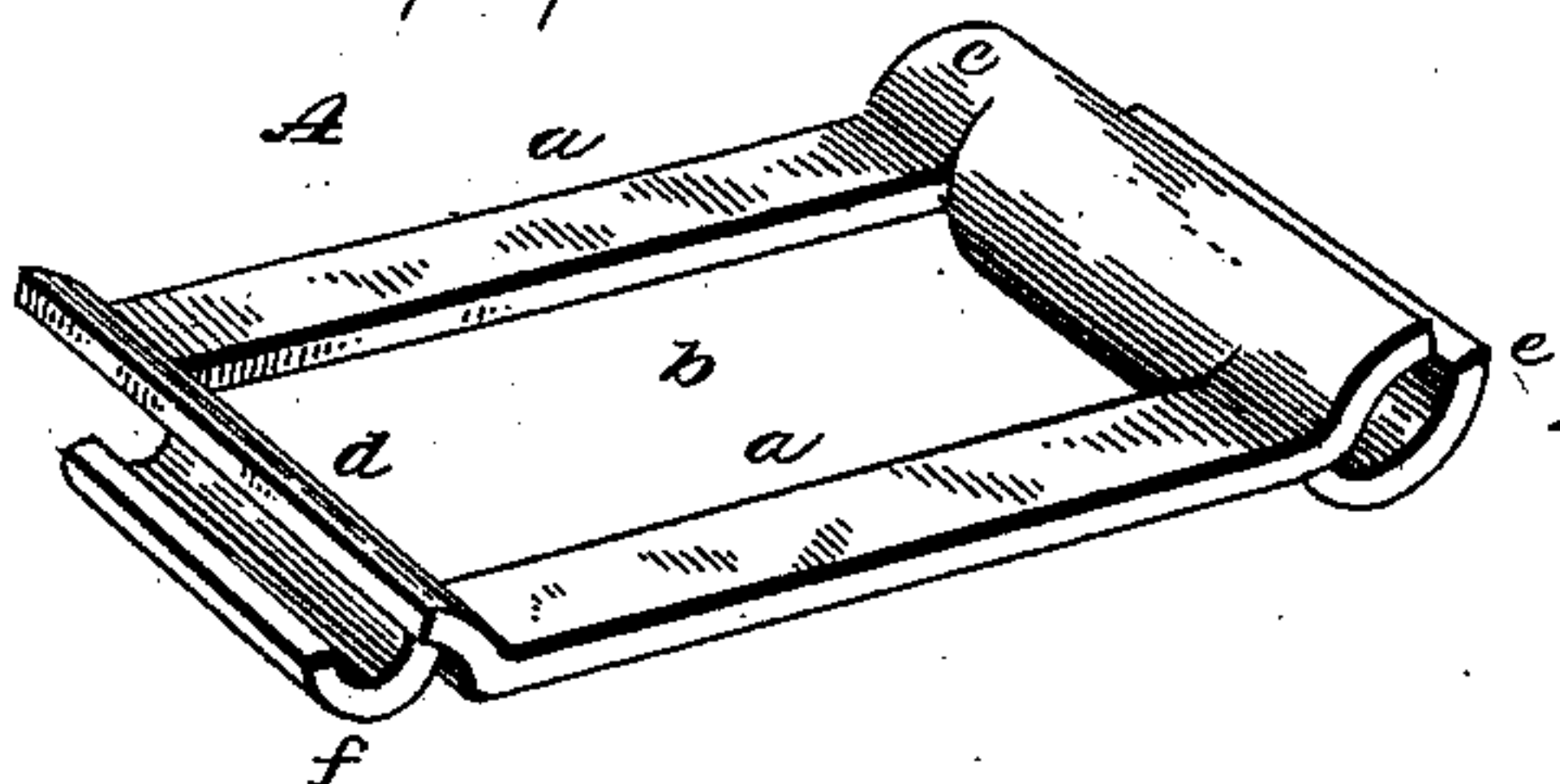


Fig. 9.



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UNITED STATES PATENT OFFICE.

SYLVANUS D. LOCKE, OF HOOSICK FALLS, NEW YORK.

DIE FOR MAKING DRIVE-CHAINS.

SPECIFICATION forming part of Letters Patent No. 393,913, dated December 4, 1888.

Original application filed February 20, 1888, Serial No. 264,666. Divided and this application filed May 9, 1888. Serial No. 273,322.
(No model.)

To all whom it may concern:

Be it known that I, SYLVANUS D. LOCKE, a citizen of the United States, residing at Hoosick Falls, in the county of Rensselaer, State of New York, have invented certain new and useful Improvements in Machines for Making Drive-Chains, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to a machine for making drive-chain links, and among the objects in view are to provide a machine for forming links from rolled or sheet metal, so that the two side bars and end and sprocket bars
15 are made from a single integral piece of metal of no larger area than the produced link, and which is adapted to punch the metal taken to form the opening of the link and roll the same to form a hollow cylindrical sprocket-bar and
20 end bar, thereby lessening the cost and producing a strong, serviceable, easily-connected sprocket-chain.

Other objects and advantages of the invention will hereinafter appear, and the novel
25 features of the same will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a perspective view of the essential parts of a machine for accomplishing the purposes in view,
30 constructed in accordance with my invention, and illustrating the first position of the blank within the same. Fig. 2 is a front elevation. Figs. 3 and 4 are vertical sections of the punching-dies, showing, respectively, the punching
35 partly and wholly completed. Figs. 5, 6, and 7 are illustrations of the different positions assumed by the formers or dies, by which the loop or hook parts of the end and sprocket bars are made. Fig. 8 is a side elevation of
40 two connected links, and Fig. 9 is a view of the completed link.

Like letters of reference indicate like parts in all the figures of the drawings.

The product of this machine forms the subject-matter of a companion application, (Serial
45 No. 268,400, filed March 24, 1888,) and no claim is herein made for the link. Only those portions of the machine to which claims of novelty are made are herein illustrated, as the
50 means for operating the same are common in this class of inventions, and hence an illustration thereof is considered unnecessary.

Referring to Fig. 8, A represents a link adapted to be formed by the machine hereinafter described, and the same consists of two
55 opposite side bars, *a*, a rectangular central opening, *b*, a sprocket-bar, *c e*, and end bar, *d f*. The sprocket-bar and end bar are of the same hollow substantially-cylindrical form, the latter, however, having its outer diameter
60 slightly smaller than the inner diameter of the former, so as to allow the end bar to freely turn or pivot in the sprocket-bar of an adjacent link. The bars *c* of the sprocket-bar and *d* of the end bar are bent or curved up-
65 wardly, as shown, from the ends of the link, while the hook or loop bars *e* and *f* of the same are punched down from the body thereof, leaving the rectangular opening *b*, and then turned outward and upward, as shown. The metal,
70 punched to form the central opening of the link, is utilized completely by the loops *e f*. To join or couple links thus constructed, it is only necessary to hold them so that the loop
75 *f* of one can be inserted within the loop *e* of another, the hollow end of one resting on the edge of the bar *c* of the sprocket-bar of the other. Then by swinging the link in the right
80 hand down on that edge as a pivot until the end bar is swung into the hollow of the sprocket-bar a connection will be formed.

The above-described link is made from a single piece of metal punched from a sheet of the desired thickness or from a strap of the
85 same of the exact width of the link.

B represents a punch operated by any suitable punching-machine, and C a punch-block.

A strip of metal being inserted between the punch and its block, a single stroke of the punch will form two unequal lips in the metal,
90 first a large one at the right for the sprocket-bar, and then a smaller one at the left for the end bar. The stroke continuing, the link is cut off or out of the full plate, and finally, at the
95 conclusion of the stroke, the upper face of the link is formed, of the exact outline desired. The large lip *s* of the link is cut out and driven directly down by an advancing punch member, *f'*, and the smaller lip, *t*, of the link is
100 formed by the following punch member *g*. The edge of the punch member *f'* works against a shear-block, *n*, that is interposed for this purpose in the punch-block, with its upper face on a level with the face *c'* of the

block, and is adapted to be subsequently withdrawn, or, by suitable mechanism, depressed, to allow the other lip, *t*, of the link to be cut out. This shear-block *n* is seated in the mortise *m* of the block, and it is preferably driven up and down by a cam. After the lips *s* and *t* are cut out and driven down, the punch still descending, the shear-edge *p* thereof, working against the edge *e* in the block *C*, cuts the link out on the dotted lines *p'*, Fig. 1, out of the sheet, after which, and just as the punch descends to its full stroke, the forming-shoulders *h'*, *k*, and *i'* crowd the link-blank against the corresponding shoulder, *b'*, *c'*, and *d'*, of the block, thus molding or fashioning the link to the form desired. The return-stroke of the punch allows the link-blank already cut and partly formed to be removed, when the sheet or strip *A'*, being again presented against the stops *a'* *a'*, formed at one end and one side of the block *C*, the second stroke of the punch cuts out a second link-blank, and so, continuing, each stroke cutting out a link-blank and partly forming a link. It now remains simply to form the lips *s* and *t* into the loop *e* of the sprocket-bar and the loop *f* of the end bar. In this second step the same or similar punch-machines are used, the punch *B* being succeeded by the follower *D* and the block *C* by a die or former, *E*, the follower having the exact face conformation that it is desired the face or top of the link shall have, and the die having the exact face conformation which it is desired that the bottom or under side of the link shall have, and also having cylindrical forming-sockets, preferably provided with fixed central stud-cores, *u* and *v*, whereby, when the follower descends, the lips *s* and *t* are formed into the loops *e* and *f*, respectively, which completes the link.

If the former *E* is open at one side and the stud-cores *u* *v* are only supported in the opposite side, as shown in Fig. 5, the link may be readily released from the die by merely slipping it off the end of the cores, or the cores may be independent and adapted to be withdrawn for this purpose, or they may be entirely dispensed with. In the latter case I prefer to make the forming-sockets semi-cylindrical to allow the links to be more readily removed.

To prevent the lips *s* and *t* from bending or buckling while being pressed to form the loops, I employ an intermediate support, *D'*. This support may be attached to the die *E*. I prefer to seat it so as to slide freely up and down in the central mortise formed in the follower *D*. This support is adapted to pass through the rectangular opening in the link-blank, and is held normally projecting out of the follower either by gravity or a spring, as shown. As the follower descends, this support accompanies it until the support strikes the face of the die, when it is stopped thereby, and is driven up into the follower as the latter continues to descend. As the follower rises on its return-stroke, the support returns

to the position shown in Fig. 5. This support serves also to guide the link-blank, and insures perfect alignment of the latter with the die when placed upon this support, as shown in Fig. 5.

To utilize gravity in holding the link-blank on the support in the position shown in Fig. 5, the follower *D* and former *E* may be substituted one for the other and the follower becomes the lower member; or the die may be made the moving member and attached to the punch-head and the follower *D* be fixed to the punch-base.

I do not limit my invention to the exact form of construction shown, as the details of the machine may be varied or modified in many ways; neither do I consider the exact order of the several steps as named above—to wit, first, punching the rectangular opening; second, cutting out the link-blank, and, third, forming the upper and lower faces of the blank—essential to my invention. For instance, the second step, the cutting out of the link-blank, may be accomplished first and the blank already separated from its sheet be presented to my machine without essentially affecting the operation of my invention in forming links from sheet metal.

The method herein set forth and its several steps are not herein claimed, as it is made the subject-matter of a companion application pending herewith, Serial No. 264,666, filed February 20, 1888.

Having described my invention, what I claim is—

1. In a machine of the class described, the combination of the punch *B*, having the punch members *f'* and *g*, with the block *C*, having the shear-block *n*, substantially as and for the purpose specified.

2. In a machine of the class described, the combination of the punch *B*, having the punch members *f'* and *g* and the shearing-edge *p*, and forming shoulders *h'*, *k*, and *i'*, with the block *C*, having the shear-block *n*, shearing-edge *e*, and the forming-shoulders *b'*, *c'*, and *d'*, substantially as specified.

3. In a machine of the class described, the combination of the follower *D* and the cylindrically-socketed former *E*, substantially as specified.

4. In a machine of the class described, the combination of the follower *D* and support *D'*, with the cylindrically-socketed former *E*, substantially as specified.

5. In a machine of the class described, the combination of the punch *B*, having the punch members *f'* and *g* and the shearing-edge *p*, with the block *C*, having the shear-block *n* and shearing-edge *e*, substantially as specified.

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

SYLVANUS D. LOCKE.

Witnesses:

N. W. LOCKE,
W. S. DUVALL.