

(No Model.)

G. F. BALLOU.
CHAIN.

No. 576,799.

Patented Feb. 9, 1897.

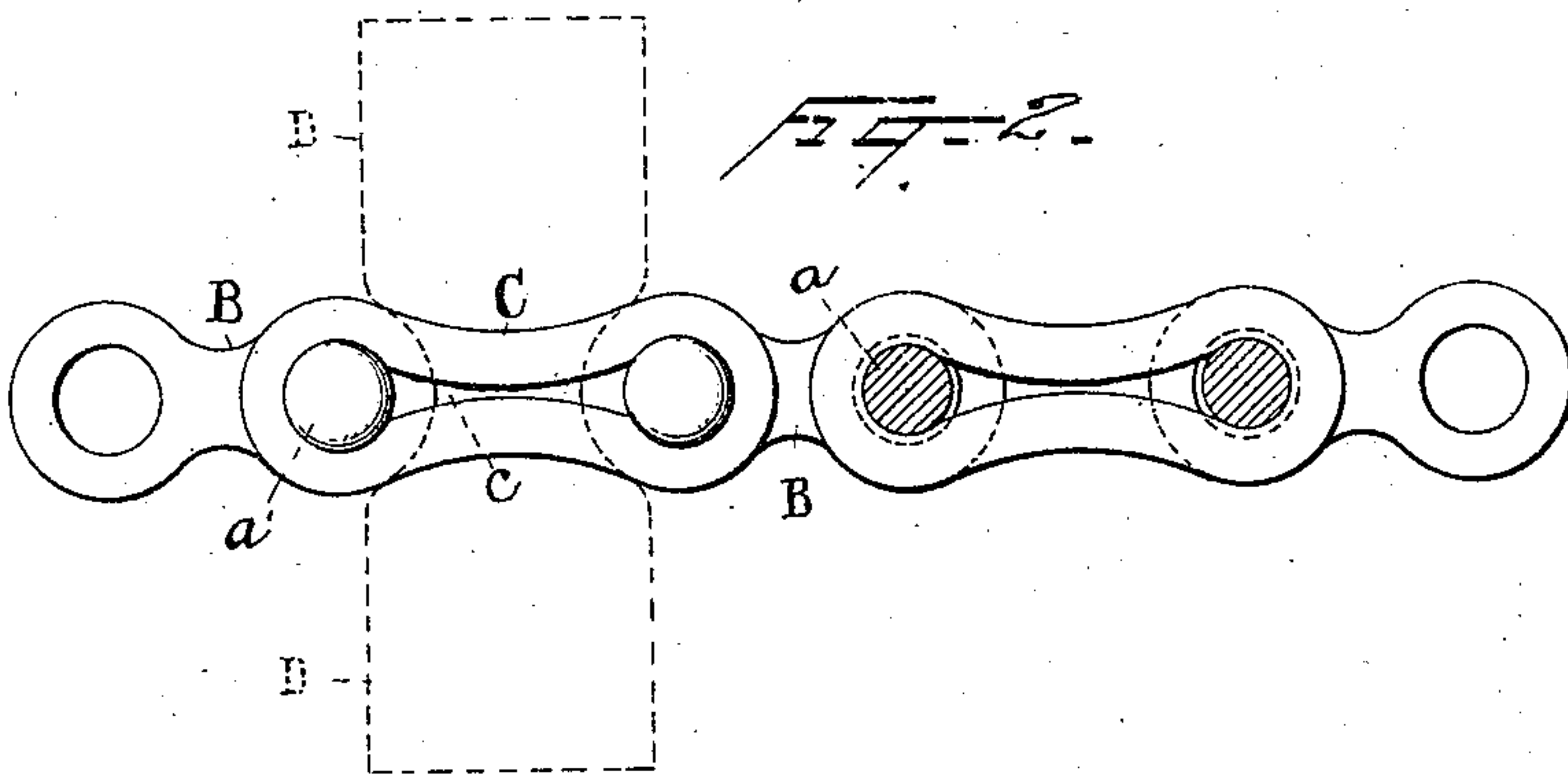
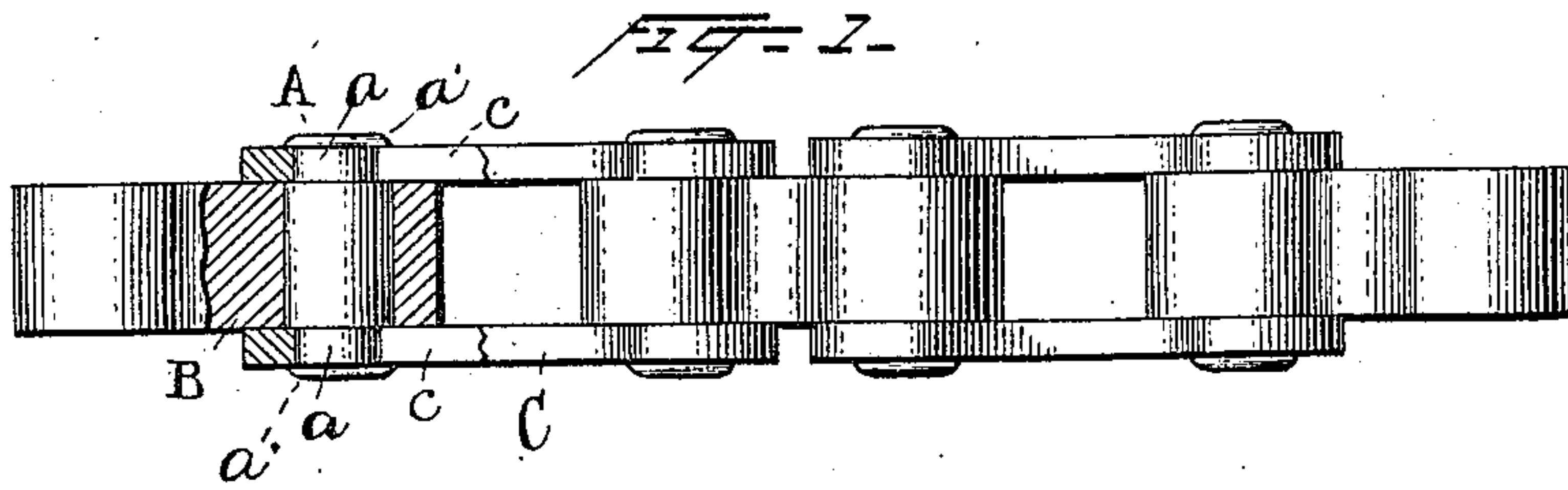


Fig. 4.

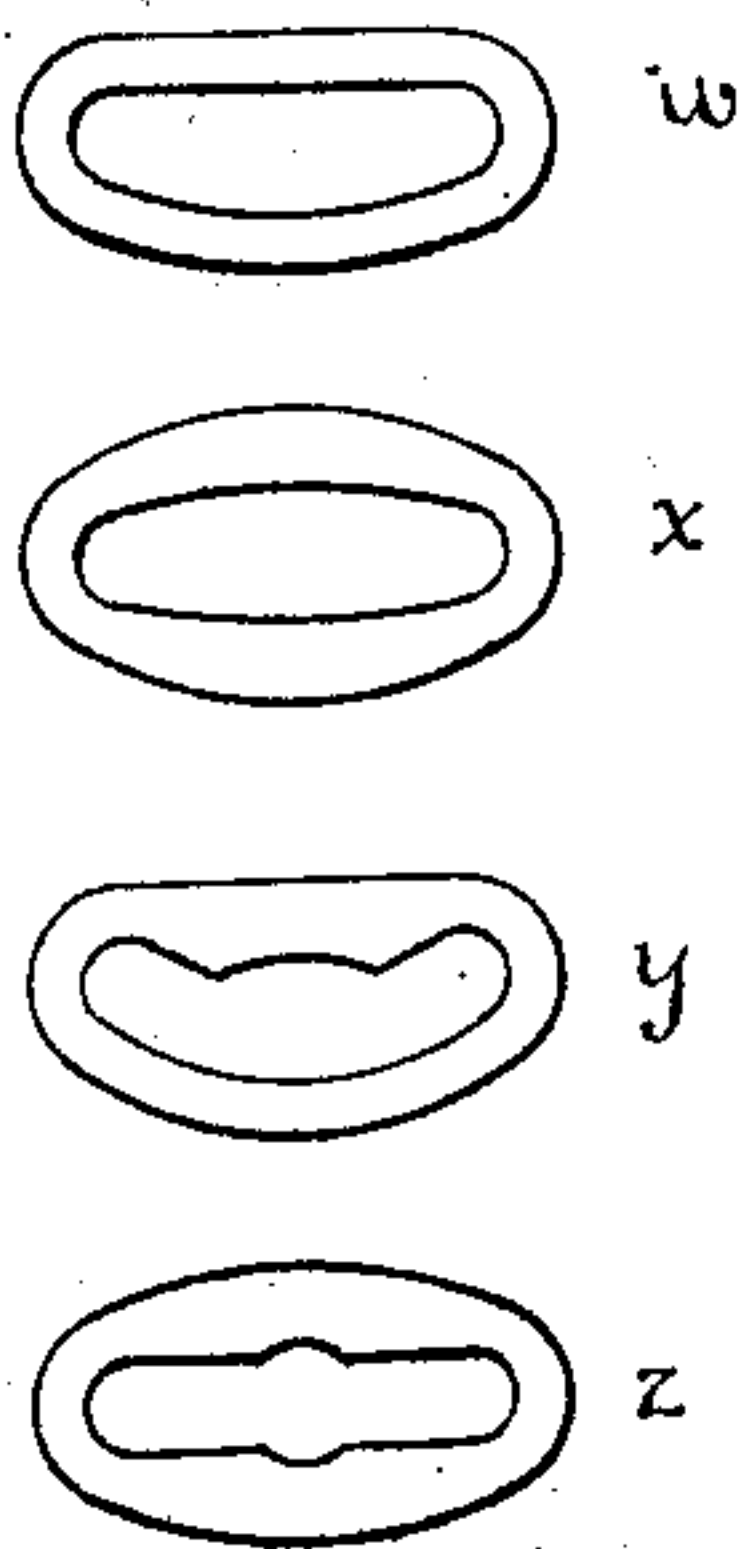


Fig. 3.

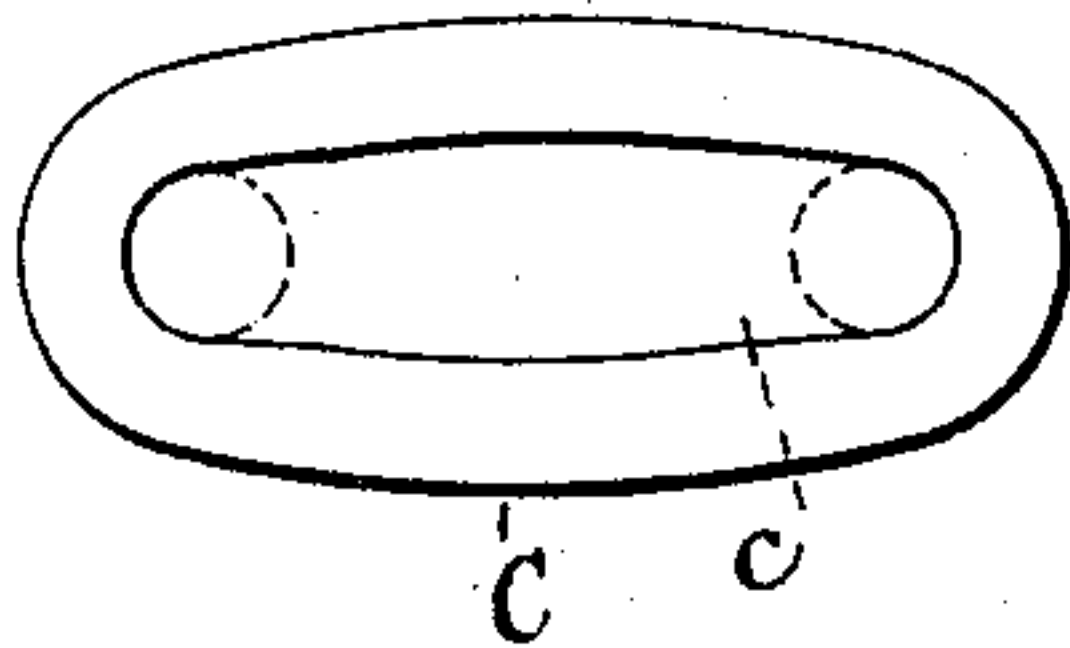
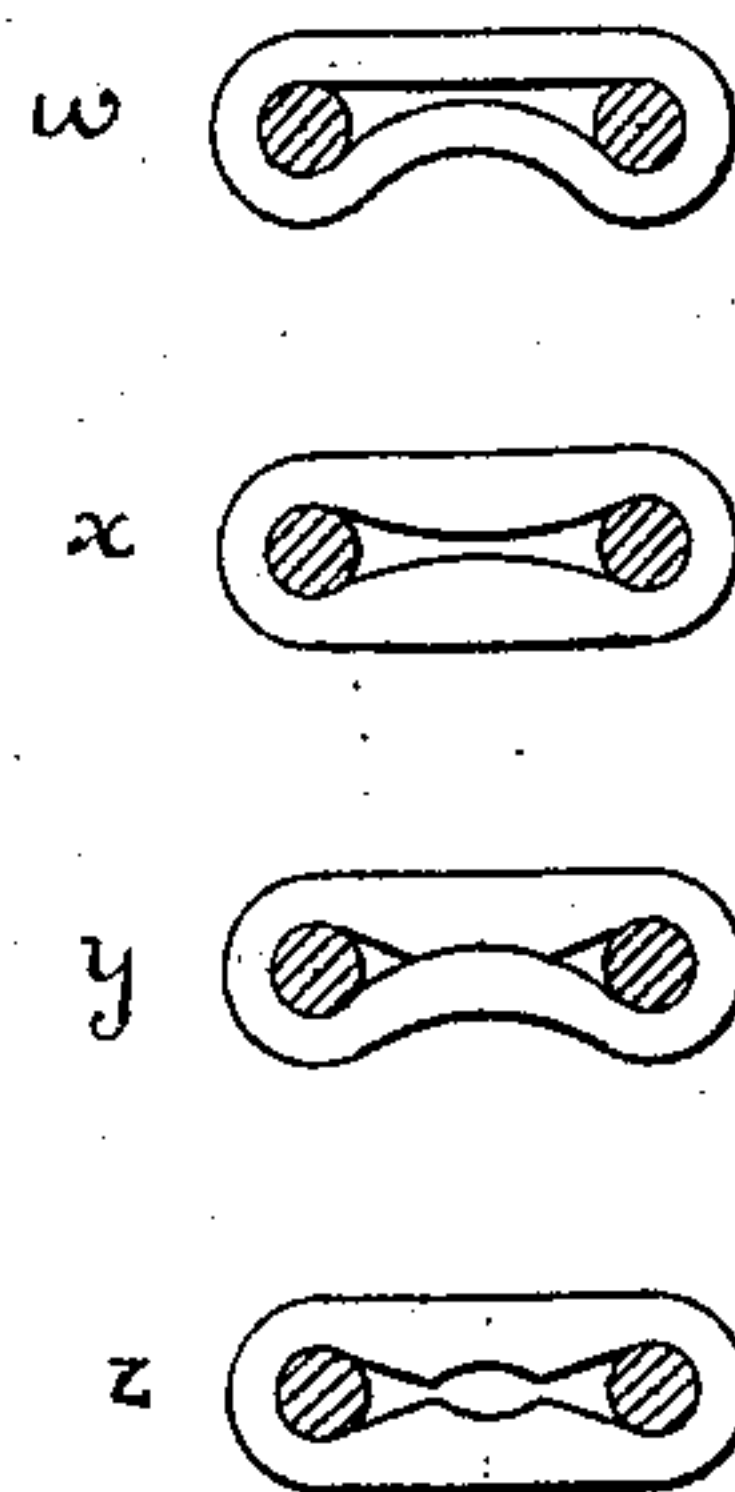


Fig. 5.



Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE F. BALLOU, OF NEW YORK, N. Y.

CHAIN.

SPECIFICATION forming part of Letters Patent No. 576,799, dated February 9, 1897.

Application filed August 3, 1896. Serial No. 601,425. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. BALLOU, a citizen of the United States, residing at New York city, in the county and State of New York, have invented a certain new and useful Improvement in Chains, of which the following is a specification.

Heretofore bicycle-chains were composed of hardened blocks provided with holes, soft links provided with holes, and connecting-pins adapted to pass through the blocks and receive the links on their ends, the pins being provided with shoulders against which the links were held, while the ends of the pins were upset or riveted to clench the links. In this construction the bodies of the pins were case-hardened, while the ends remained soft to permit riveting. While this is the form of chain in universal use, it is objectionable on account of the time required in riveting and because of the fact that the pins cannot be thoroughly hardened. To obviate these objections, separable chains have been proposed—that is, chains wherein the pins are thoroughly hardened and provided with hooked or recessed ends with which the links engage, and the links being shaped so that the parts can only be connected or disconnected by partly or wholly moving adjacent links and blocks over one another so as to overlap, and thus permitting the longitudinal movement of the links relative to the blocks and pins to bring the pins to an enlarged opening or slot in the link and permit its engagement or disengagement with the link. While this form of chain overcame the objections pointed out, the cost of manufacture was not decreased and the chain was open to objection on account of its readily becoming entirely separated when not in use and the possibility of its becoming separated in use, although it did possess the advantage of quick repair, particularly while on the road.

The object of my invention is to produce a chain which possesses all the advantages of the separable chain—*i. e.*, thorough hardening of the pins and quick repair, and, furthermore, the desirable features of extreme uniformity of parts and maximum strength for a given weight of material without increasing the cost of same, and the rapidity in connecting and permanently securing the parts to-

gether, thus reducing the cost of that part of the process.

In carrying my invention into effect I employ a connecting-pin of uniform diameter and preferably provided with a shallow groove at each end wide enough to receive the link and thus forming heads on the ends of the pins. The pins are afterward thoroughly hardened. These pins are inserted in holes in the hardened chain-blocks, and the links are punched from strip or sheet metal, with holes or slots large enough for the insertion of the heads of the pins. The parts are assembled by passing a pin through two links with a block between them, and the parts are secured together by subjecting the links to pressure upon their outer longitudinal edges to force the inner edges of the links—that is, at the holes or slots—into the grooves of the pin, thus clenching the pin to the links and preventing its displacement. In subjecting the links to pressure they spread slightly and the parts entering the grooves of the pin are thus jammed between the sides of the groove, resulting in a joint between the pin and links similar to the joints formed between the links and pins by riveting.

In practice the links will be subjected to pressure by passing the chain between two rolls provided with clenching-dies properly spaced, and it will readily be understood how rapidly a chain may be assembled and passed through the clenching-rolls.

My improved chain is illustrated in the accompanying drawings, in which—

Figure 1 is a view of a few links, part of one link being broken away to show the pin; Fig. 2, a side view with the heads of two of the pins cut off to show how the links clench the pins, the clenching-dies being shown in dotted lines; Fig. 3, a separate side view of one of the links before being clinched; Fig. 4 shows on a smaller scale four modified forms of links *w x y z*; and Fig. 5 shows links *w x y z* of Fig. 4 when clenched upon the pins.

Referring to the drawings, A A are the pins, B B the blocks, and C C the links. The pins are provided with shallow grooves *a a* near each end, thus forming heads *a' a'* at the ends of the pins. The blocks are provided with holes for the pins, as usual. The links, which are punched from strip or sheet metal,

may have any desired shape, five different shapes being shown in the drawings. Each link is provided with a slot *c*, which is punched out at the same time the link is punched from the strip or sheet of metal, and this slot must be wide enough at some point to admit the heads *a'* of the pins. The ends of the slots are curved, as shown, and the diameter of the slot at that point is of such size as to closely fit the grooved portion of the pin, as shown in dotted lines in Fig. 3. In case the links stretch or loosen on the pins after prolonged use they may be readily caused to again firmly clench the pin by a suitable hand-operated clamping-tool, which will also take up the slack due to the stretching of the links.

If desired, in joining the two ends of a chain the pin which couples the block B at one end to the links C at the other end may be a screw-bolt provided with a check-nut, as usual.

While I have described the links C as having slots to receive the pins, I wish it to be understood that I do not limit myself to such an arrangement, since the same end may be accomplished by providing, for instance, a hole at each end of the link larger in diameter than the diameter of the pin and clenching the ends of the links, but I do not believe such a form will give as good a result as the slotted link. Furthermore, while I have described the pins as being grooved at each end I do not limit myself to that arrangement, because the pins could be differently constructed, but not so cheaply as the form shown. For instance, the ends of the pins might be milled, so that when the soft link is clenched the hard points of the milled surface will be forced into the link and form a tight joint. Furthermore, the grooves in the links might be rectangular, round, or V-shaped. Nor do I limit myself to the use of hardened pins, since it will be readily understood that my invention is applicable to the manufacture of chains which do not require hardened pins.

It will also be understood that although I have described my invention in connection with bicycle-chains my invention may be equally as well employed in the manufacture of chains intended for other uses.

What I claim is—

1. As an article of manufacture, a chain comprising blocks having holes, pins passing through the holes, and links having apertures for receiving the ends of the pins, and which links are caused by pressure to clench the pins, substantially as set forth.

2. As an article of manufacture, a chain comprising blocks having holes, pins passing through the holes and provided with a groove at each end so as to form heads on the pins, and links having apertures of a width at some point sufficient to admit the heads and permit the links to enter the grooves of the pins, and which links are subjected to pressure to force the inner edges of the links closely within the grooves to clench the pins making a tight joint and holding the parts against displacement, substantially as set forth.

3. As an article of manufacture, a chain comprising blocks having holes, pins passing through the holes and provided with a groove at each end so as to form heads on the pins, and slotted links whose slots at some point are of such width as to receive the heads of the pins and the ends of which slots are curved and of such diameter as to snugly fit the grooves of the pins, and which links are caused by pressure to clench the pins, substantially as set forth.

4. A bicycle-chain comprising blocks, longitudinally-slotted links, and connecting-pins, said links being adapted to have their longitudinal sides compressed to shorten the link, substantially as set forth.

This specification signed and witnessed this 28th day of July, 1896.

GEO. F. BALLOU.

Witnesses:

EUGENE CONRAN,
GEORGE P. DYER.