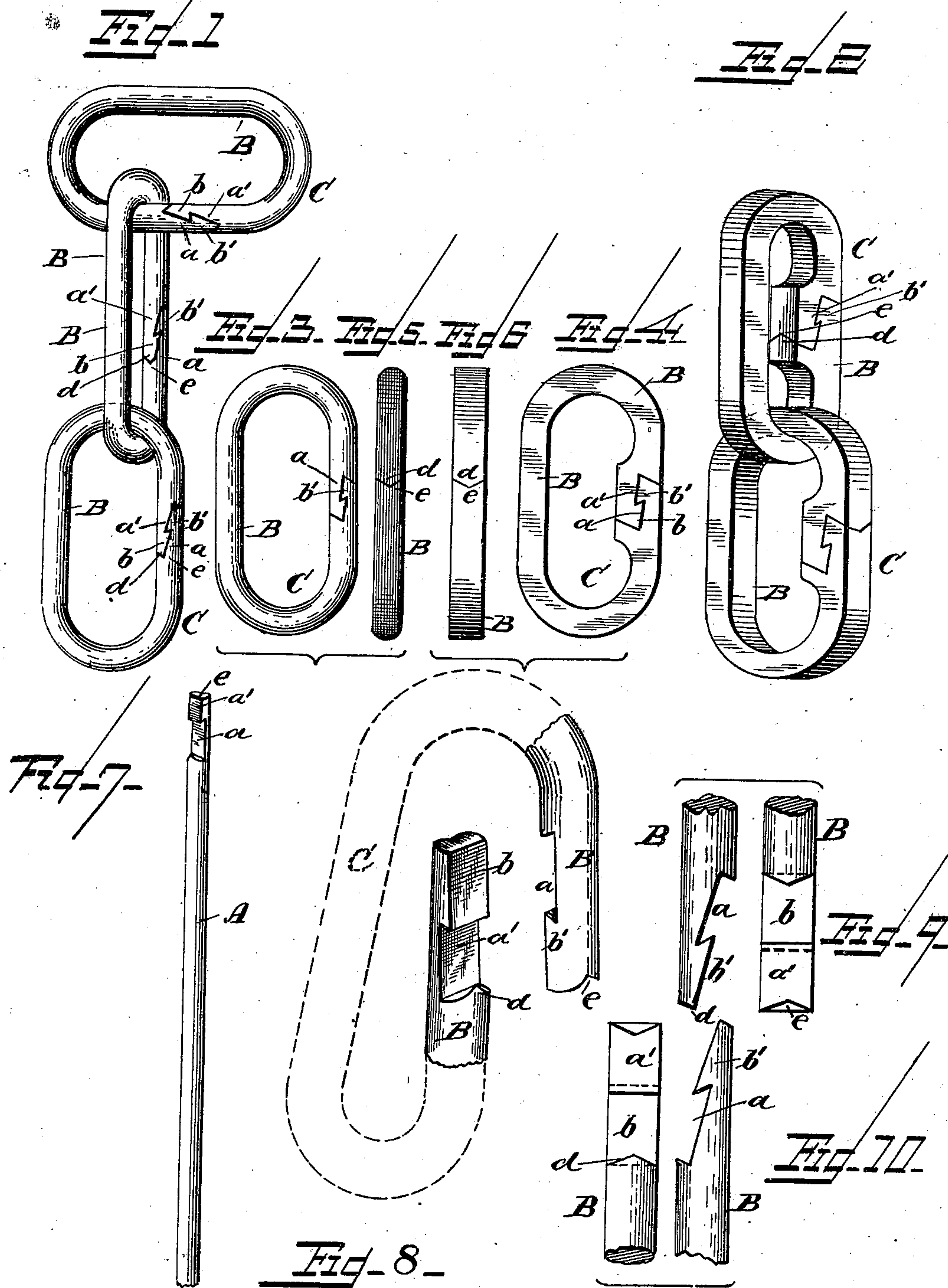


(No Model.)

R. A. BREUL.  
CHAIN LINK.

No. 510,238.

Patented Dec. 5, 1893.



WITNESSES:  
*R. L. Ourand*  
*James H. Jones*

INVENTOR:  
*Richard A. Breul*  
*By James Duggan & Co.*  
Attorneys.



# UNITED STATES PATENT OFFICE.

RICHARD A. BREUL, OF BRIDGEPORT, CONNECTICUT.

## CHAIN-LINK.

SPECIFICATION forming part of Letters Patent No. 510,238, dated December 5, 1893.

Application filed April 3, 1893. Serial No. 468,867. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD A. BREUL, a citizen of the United States, and a resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Chain-Links; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a perspective view of a piece of chain built up from my improved links, made of round metal. Fig. 2 is a similar view of a piece of chain comprising links of my improved construction; made of flat metal. Fig. 3 is a detail view, in plan, of one of my improved round-metal links. Fig. 4 is a detail view, in plan, of one of my improved flat-metal links. Fig. 5 is a side view of the link represented in Fig. 3. Fig. 6 is a side view of the link shown in Fig. 4. Fig. 7 is a view of the blank from which the round-metal links are cut. Fig. 8 illustrates the way of bending the straight pieces or blanks, after the same have been cut, to form the links, but before the meeting ends have been interlocked to form the finished link; and Figs. 9 and 10 are detail views, on an enlarged scale, of the notched and interlocking meeting ends of a link, before the ends are sprung together to form a closed loop.

Like letters of reference denote corresponding parts in all the figures.

This invention relates to chains of that type in which the links are formed by loops which are interlocked with one another, in contradistinction to the ordinary forms of chains in which the links are welded, and my improvement consists in the novel and specific construction of the interlocking links as will be hereinafter more fully described and particularly pointed out in the claim.

Referring to the drawings, the letter A denotes the blank from which the pieces or sections to form the individual links are cut. This blank may either be round, square or flat, according to whether it is desired to make a chain of round, square or flat links. By means of a suitable tool, or suitable machinery, this

blank is cut into pieces, B, of the proper length to form links of the desired size, the blank being cut across obliquely so as to form two notches *a* and *a'*, one at each end, with corresponding dovetailed lips or projections *b* and *b'*; the dovetailed lip *b* being formed from the metal left in cutting the notch *a*, while the other finger or dovetailed projection, *b'*, is similarly formed from or by the metal left in cutting the other notch *a'*. It follows from this that there is absolutely no waste of metal and that the dovetail *b* will coincide with and fit closely into its dovetailed notch or recess *a*, while the other dovetail or hooked finger *b'* will similarly coincide with and fit into the other dovetailed notch or recess *a'*. After cutting the blanks, these are bent to form oblong loops, C, a sufficient number of which are assembled and looped together to form a chain of any desired length. As the loops are formed, they are completed by interlocking the notched ends which is done simply by springing them together; the extreme ends of each section B being cut out to form a V-shaped notch *e*, at one end, with a correspondingly shaped and coinciding wedge-shaped projection *d* at the opposite end; said registering end notches and projections *e* and *d* being in planes at right angles to the interlocking parts *a b* and *a' b'*. The object of the interlocking notches *e* and V-shaped projections *d* is to prevent lateral motion of the meeting ends of the link or loop after these have been sprung together, while the interlocking dovetails *a b* and *a' b'* will resist strain or tension in a longitudinal direction; so that after the chain has been formed by assembling the links or loops and springing them together, it will be impossible for them to be pulled apart without rupture of the metal or other material from which the chain is built up. The shape of the interlocking dovetails is such, as will be clearly seen by reference to the drawings, that the greater the strain to which the chain is subjected, the firmer will the dovetails *a b* and *a' b'* grip and interlock with one another; the interlocking notch *e* and projection *d* effectually preventing lateral motion and disengagement of the notched and interlocking meeting ends of the individual links.

It will be obvious that a chain of this char-



acter may be made from links which are round, square, or rectangular in cross-section; the shape and arrangement of the interlocking notches  $a a'$  and  $e$  with the dovetails  $b b'$  and  $d$  being the same in all cases. If the individual links are made flat, from blanks cut from thin flat strips of metal, it may be desirable to reinforce the notched and interlocking ends by making these parts thicker; as shown at  $f$  in Figs. 2 and 4, but this is not necessary in round links of the ordinary type.

In order to bring the notched ends of the links together and permanently interlock them in the manner described, the metal of which they are made, viz: spring steel, must be tempered and annealed so as to give it sufficient "spring," or elasticity and resiliency, to snap or spring the notched parts together in connecting the links to form a chain. It requires considerable pressure to do this, and it is accomplished by machinery designed by me for that express purpose; but after the notched and interlocking ends have been "sprung" together in this manner, as illustrated on the drawings showing the finished link, the ends cannot possibly come apart, and no soldering or brazing is required in order to make the closing complete. At the same time, if desired, the notched joint may be covered with solder, or the whole link may be galvanized, tinned over, or nickel-plated, so as to conceal the joint from view.

I am aware that chain links have been made

before with interlocking meeting ends, as shown for example, in the expired patent to Frazer, No. 35,150, dated May 6, 1862, and patent to Kampf, No. 206,335, dated July 23, 1878; but none of these patents show the auxiliary laterally interlocking dovetails  $d$  and  $e$ , which constitute an important and essential feature of my improvement. In the absence of means for preventing such lateral motion or displacement the chain is liable to be accidentally severed by lateral pressure—a drawback which is entirely overcome by using links of my improved construction.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

The chain link herein shown and described cut out on its inner sides near the meeting ends to form dovetailed notches  $a, a'$ , corresponding dovetailed projections  $b, b'$ , interlocking with one another, a notch  $e$  on one of said ends, a V-shaped projection  $d$ , at the inner end of notch  $a'$ , interlocking therewith in a plane at right angles to the notches  $a a'$  and projections  $b, b'$ , substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

RICHARD A. BREUL.

Witnesses:

AUGUST PETERSON,  
BENNETT S. JONES.