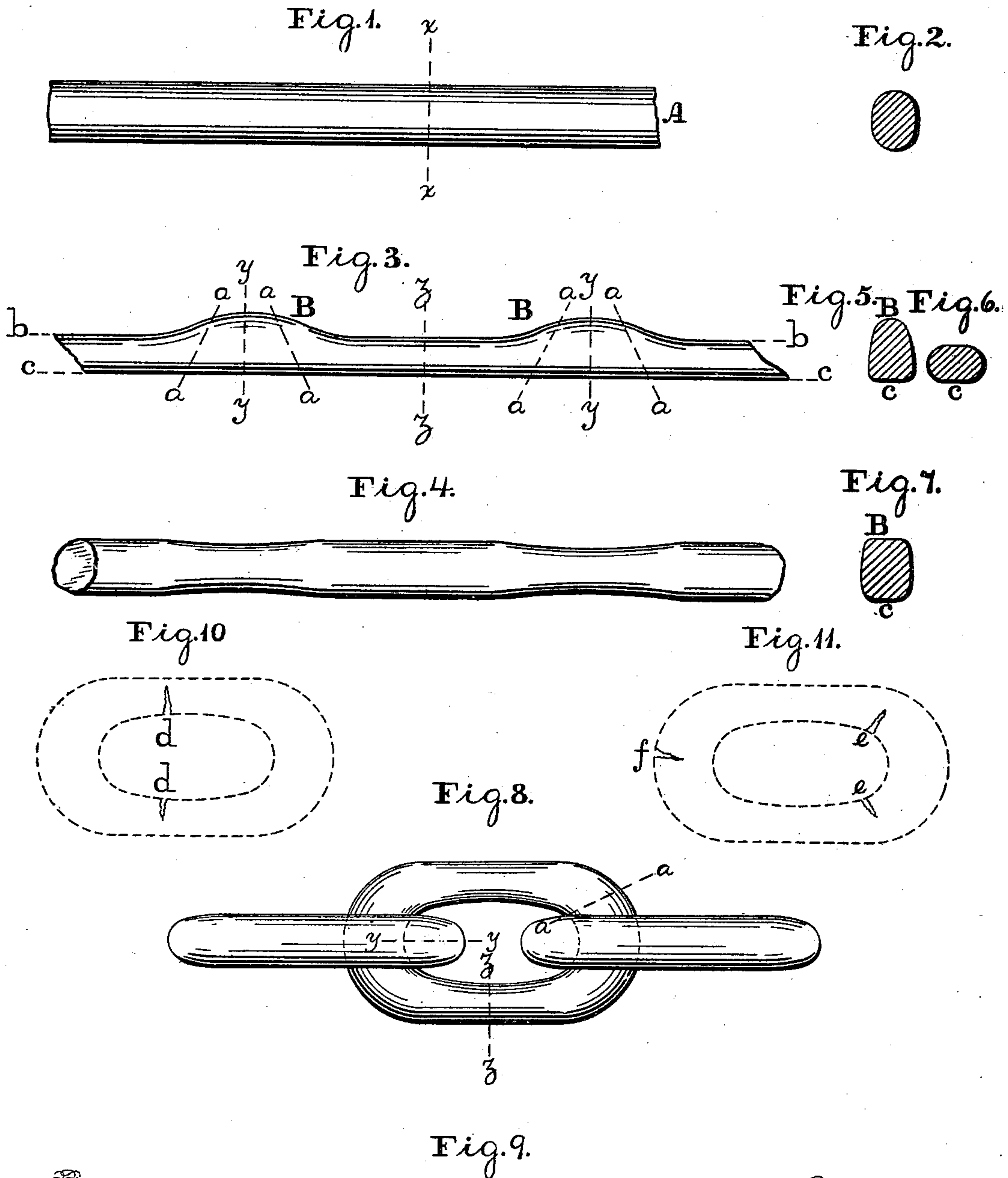


C. A. CHAMBERLIN.  
Chain-Cable.

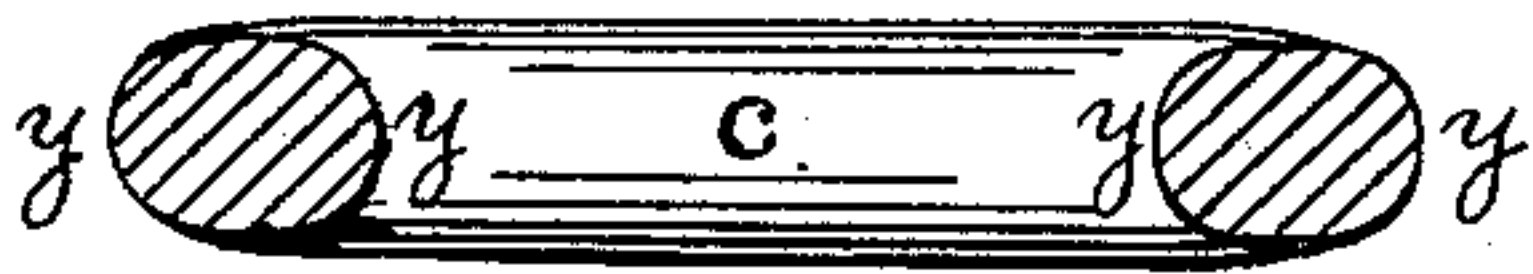
No. 165,541.

Patented July 13, 1875.



Witnesses:

L. F. Brous,  
A. P. Grant.



Inventor:

Charles A. Chamberlin.  
by John A. Diederichs  
Atty.

# UNITED STATES PATENT OFFICE.

CHARLES A. CHAMBERLIN, OF CAMDEN, NEW JERSEY.

## IMPROVEMENT IN CHAIN-CABLES.

Specification forming part of Letters Patent No. 165,541, dated July 13, 1875; application filed March 13, 1875.

*To all whom it may concern:*

Be it known that I, CHARLES A. CHAMBERLIN, of the city and county of Camden and State of New Jersey, have invented a new and useful Improvement in Chain-Cables; and I do hereby declare the following to be a clear and exact description of the nature thereof, sufficient to enable others skilled in the art to which my invention appertains to fully understand, make, and use the same, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a side view of the bar from which the blank is produced. Fig 2 is a transverse section thereof in line  $x x$ , Fig. 1. Figs. 3 and 4 are side views of the blank from which the links of cables are constructed. Fig. 5 is a transverse section in line  $y y$ , Fig. 3. Fig. 6 is a transverse section in line  $z z$ , Fig. 3. Fig. 7 is a transverse section in line  $a a$ , Fig. 3. Fig. 8 is a view of a portion of a chain. Fig. 9 is a longitudinal section of one of the links. Figs. 10 and 11 are diagrams, to be hereafter referred to.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists in forming the inner faces of the sides of the several links of a chain-cable broader than the usual circular form would give, whereby it is enabled better to withstand the tearing process or fracture to which it is subject on said inner faces. It also consists in extending or carrying the broad sides to points at the junction of the sides and bends, and in extending or carrying the bend swells up to or beyond said junction toward the center of the sides, so that there is increased thickness and depth at said points, whereby provision is made to prevent fracture thereat. It also consists in a flexible chain-cable, composed of links with flattened bends of greater depth and thickness in the line of strain. It further consists in forming the several links of increased depth and thickness at the points of junction of the sides and bends, and flattened at said points, and of increased depth in the bends in the line of strain. It also consists in forming the inner faces of the sides of the several links broader than the usual circular form would give, and of increased depth and thickness at the points of

junction of the sides and bends, and flattened at those points. It also consists in forming the inner faces of the sides of the several links broader than the usual circular form would give, and the bends of increased depth and thickness. It also consists of a chain-cable having the links formed with broad inner sides, increased thickness and depth at or about the points of junction of the sides and bends, and increased depth in the longitudinal direction of said bends, whereby the cable is enabled to withstand the several strains to which it is subjected.

Referring to the drawings, A represents a bar, which is rolled in elliptical form, as seen in Fig. 2. The bar A is re-rolled, so as to produce on one of the sides,  $b$ , at certain intervals, swells B B, the contour of which, in cross-section  $y y$ , is the figure seen in Fig. 5, but the elliptical form of the remainder is preserved, as shown in Fig. 6, which is a section in line  $z z$ , but with the axes reversed. The broad side or face  $c$  also extends to the points at or about the junction of the swells and adjacent portions of the bar, so that at said points, as in lines  $a a$ , there is an increased thickness of metal. When the bar is bent into shape the swells B occupy position at the ends or bends of the link, said ends or bends thus having increased depth longitudinally, as in the line  $y y$ , said swells reaching beyond or overlapping the points of junction of the sides and bends, so as to give increased depth in the lines  $a a$ .

It will be seen that, owing to the elliptical shape of the bar A, said bar, when bent into shape, will present an inner face,  $c$ , broader than a circular form would give, whereby the broad side or face  $c$  resists the tearing action or fracture to which it is subjected on its inner side, such action or fracture being shown at  $d$ , Fig. 10. The tendency to fracture at the points of junction between the sides and bends, as shown at  $e e$ , Fig. 11, is resisted by the increased thickness and depth of the metal in the lines  $a a$  and its flattened form, which lines are near the points at which the fractures  $e e$  generally occur. The tendency to fracture on the outside of the bend, say, at  $f$ , due to sudden jerks or strain, is resisted by the increased depth and thickness of metal in the line  $y y$ .



The depth of the bend must not be greater than the internal diameter thereof, in order that one link will play freely in another without binding, and the chain thus possess the requisite flexibility.

In making comparison, I employ as a basis the sides of an ordinary link of round iron of equal area in cross-section.

By depth I mean the direction of the plane of greatest breadth of the link, and by thickness the direction perpendicular to the depth.

I do not claim, broadly, greater depth and thickness in the bends.

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

1. A chain-cable composed of links having the broad inner faces *c c*, substantially as and for the purpose set forth.

2. A chain-cable composed of links with increased depth and thickness at the points of junction of the sides and bends, and flattened at those points, so that the depth will be greater than the thickness, as at *a a*, substantially as and for the purpose set forth.

3. A flexible chain-cable composed of links with flattened bends of increased depth and thickness in the line of strain, substantially as and for the purpose set forth.

4. A chain-cable composed of links construct-

ed with increased depth and thickness at the points of junction of the sides and bends, as at *a a*, and flattened at said points, and increased in depth and thickness in the bends in the line of strain, as at *y y*, said bends being likewise flattened, substantially as and for the purpose set forth.

5. A chain-cable, the links of which have side bars with broad inner faces *c*, and of increased depth and thickness at the points of junction of the sides and bends, as at *a a*, and flattened at said points, substantially as and for the purpose set forth.

6. A chain-cable, the links of which have side bars with broad inner faces *c*, and flattened bends of increased depth and thickness in the line of strain, as at *y y*, substantially as and for the purpose set forth.

7. A chain-cable composed wholly or in part of links elliptical on the inner face, as at *c*, increased in depth and thickness at or about the points of junction of the sides and bends, as at *a a*, and increased in depth at the bends, as at *y y*, substantially as and for the purpose set forth.

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Witnesses:

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