(Model.)

J. H. ELWARD.

DRIVE CHAIN.

No. 345,579. Patented July 13, 1886.

Fig. 7.

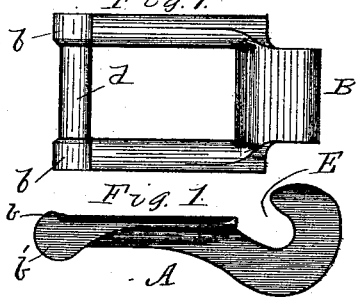


Fig. 1.

Fig. 3.

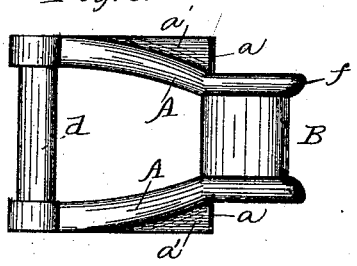


Fig. 2.

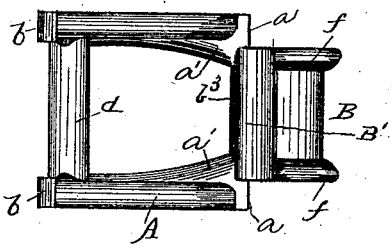


Fig. 4.

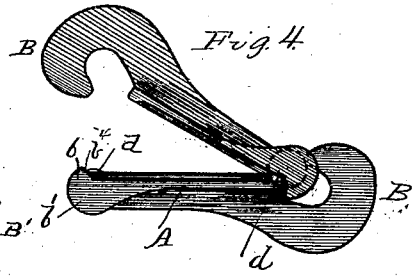


Fig. 5.

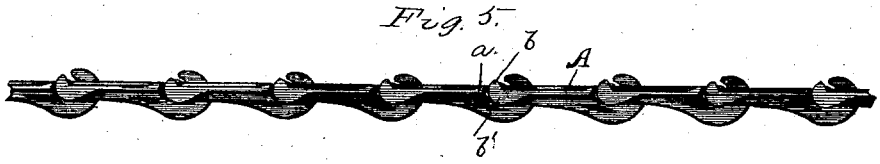
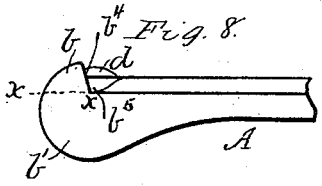


Fig. 6.

Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN H. ELWARD, OF ST. PAUL, MINNESOTA.

DRIVE-CHAIN.

SPECIFICATION forming part of Letters Patent No. 345,579, dated July 13, 1886.

Application filed April 3, 1885. Serial No. 161,133. (Model.)

To all whom it may concern:

Be it known that I, JOHN H. ELWARD, a citizen of the United States of America, residing in the city of St. Paul, in the county of Ramsey, in the State of Minnesota, have invented new and useful Improvements in Drive-Chain Links; and I do hereby declare the following to be a full, clear, and correct description of the invention, such as will enable others skilled in mechanical art to make and use the same, reference being had to the accompanying drawings, which, with the reference-letters, form a part of this specification.

Figure 1 is a side view of a link embodying my improvements. Fig. 2 is a top view thereof. Fig. 3 is a bottom view of a modified link. Fig. 4 shows two of the links in the position occupied when they are being coupled or uncoupled. Fig. 5 is a side view of a chain constructed of my improved link. Fig. 6 is a top view of the same. Fig. 7 is a bottom view of a link similar to that in Fig. 2, but without the inwardly-projecting webs of the latter. Fig. 8 shows, on a larger scale, a portion of one of the side bars.

In the drawings, A A represent the side bars, *d* the end bar, and B the coupling-hook of the link. The side bars may be of uniform diameter from end to end, as shown in Fig. 7, or they may be formed with strengthening-webs, as shown at *a' a'*, which latter may extend inwardly, as shown in Figs. 2 and 6, or which may extend outwardly, as shown in Fig. 3. The width of the hook B is equal to the length of the end bar, *d*, and when it engages with the bar of the adjacent link it fits snugly, so that there is no looseness laterally. By preference this hook is provided with ribs or beads *f* at the ends, which act to strengthen it. At the ends of the end bar, *d*, there are formed party-circular enlargements or shoulders, as shown at *b b'*. By examining Fig. 8 it will be seen that the part *b* extends to a point considerably above the line of the side bar A. The throat or passage-way E, between the edge of the hook B and the wall of the recess at b^3, is of a width but slightly greater than the cross-diameter of the end bar, *d*, so that the latter can pass through said throat into the hook B when the links are so arranged as to permit it. The ends of the side bars, A A, which are adjacent to the hook B, are formed with well-defined shoulders, as at *a a*, these being at a distance from the axis of the aperture in the hook B equal to the radius of the curved shoulder *b b'*. Again referring to Fig. 8, it will be seen that the upper surfaces of the side bars, A A, are lower than the upper end of the shoulder *b b'*, although it is not essential that the side bars should be constructed throughout their length with this difference in position of their upper surfaces relative to the upper points of the shoulders, so long as they are lower for a sufficient distance back from said shoulders to permit coupling and uncoupling.

When two of the links are to be joined or detached, they are put into the position shown in Fig. 4, and by referring to said figure it will be seen that the shoulder *b b'* of the upper link has been turned around far enough to permit it to pass the upper points of the shoulders *a*, at the same time the end bar, *d*, (shown in dotted lines,) being brought so that it can be pushed into or drawn out from the hook B through throat E. After the end bar has been pushed into the hook-aperture, the link carrying the end bar can be turned into the position shown in Fig. 5. Immediately after it has begun to so turn the part *b b'* comes into contact with the shoulder *a*, and after these last said parts have begun to engage, the end bar, *d*, will be held so far within the hook B that it cannot be detached therefrom. The end bar, *d*, it will be seen by examining Figs. 4 and 8, projects somewhat above the lowest parts of the adjacent side bars. The cams *b* are shown as extending around so as to have their inner edges, b^4, on lines at angles with the top surfaces of the side bars, approximating right angles, though this angle may be varied, more or less. Between these edges of the cams *b* and the top surfaces of the adjacent side bars there are formed sharp angles or recesses b^5. It is above the bottoms of these angles or recesses that the end bar, *d*, projects, as will be seen. The inner wall, B', of the hook B is recessed or sunk inward, as shown at b^3, this recess at b^3 corresponding in depth to the distance that the end bar, *d*, projects above the side bars. It not only permits one link to be readily coupled with or uncoupled

from another, but also enables a large percentage of the metal to be saved in each link. When one link is being coupled with or uncoupled from another, as shown in Fig. 4, the projecting part of the end bar, *d*, is allowed to pass downward by reason of the recess b^3, the points of the shoulders *a* at the same instant passing into the angles or sockets b^5, inside of the upward-projecting cams *b*.

The chains heretofore in use, so made as to permit the links to be coupled and uncoupled one from another after throwing one or more of them into an unusual position, have had incident to them great inconvenience, owing to the fact that as soon as a little wear had taken place at the axial parts the links could be easily disengaged accidently, and as a result such accidental detachments were constantly occurring.

One of the objects of my invention is to prevent this accidental detachment, and I effectually accomplish this by having the locking-shoulder *b b'* extended to a point considerably above the side bar, as will be readily understood by again referring to Fig. 8, wherein the part *b* is shown as lying above the dotted line *x x*. This insures that the lock shall be effective, even if one of the links should be thrown up somewhat toward the position shown in Fig. 4, an accidental uncoupling being, in fact, impossible until they have come fully into the position shown in said figure. By having the coupling devices made in this way I overcome entirely the trouble incident to detachable links shortly after they have been put into use.

I am aware of the fact that use has heretofore been made of a rectangular open link adapted to be coupled with and uncoupled from an adjacent link, it being composed of two side bars having cam-like projections at the ends, an end bar the upper edge of which was flush with the upper sides or edges of the side bars, the latter being at no point higher than the end bar, and having also a hook opposite to the end bar, formed with an elongated or ellipse-like eye, and with shoulders (to receive the thrust of the aforesaid cam-like projections of the adjacent side bars) between the ends of the side bars proper and the end of the aforesaid hook, and I do not claim such a device as my invention; but it is to overcome the serious objections met with in practice, when these chain-links are used, that I have devised the present chain.

It is a well-known fact that the wear occurring between the aforesaid abutting shoulders and the cam-like projections on the side bars in chains constructed with links of the kind above referred to, is so great that the articulations soon become loose, and the constantly-recurring accidental disengagement of links renders the chain practically inoperative, and therefore in the manufacture of these links it has been found necessary to make them, in the first instance, of such shape that they cannot be coupled and uncoupled in the true sense—that is, without bending some part—and the hooks are formed so as to require them to be positively forced open (by means of tools specially provided for the purpose) when the end bars of the adjacent links are to be coupled with or uncoupled from them. In my case I provide a hook which is at all times sufficiently open to allow the ready insertion or withdrawal of an end bar, and the socket within this hook is not elongated or ellipse-shaped, the parts being so related that as soon as the end bar has passed the entrance-throat it at once bears against the wall of the eye, and does not have to be slipped some distance along longitudinally of the link, to begin to have its bearing, as is the case in the construction heretofore in use and above referred to. I do not have a shoulder upon the side edges of the hook at points beyond the ends of the side bars—that is, the ends near the hook—which shoulders must necessarily have so small a wearing-surface that they are rapidly cut away and allow slackness. Again, my chain differs materially from those referred to in this, that I employ a shoulder or projection, *b*, which extends upwardly from the upper edge of the side bar, and which is adapted to bear against the end of an adjacent side bar, so as to prevent detachment, even if two adjacent links should get into positions at right angles to each other. I not only provide a much more durable construction so far as the wearing-surfaces are concerned, but a much cheaper one, inasmuch as I am able to shorten up the hook portion very much, and save much metal which has been necessary when the parts have been constructed and related as heretofore. The link may be considered as being composed of two main parts—namely, a rectangular tooth-engaging portion and a hook projecting forwardly from the front bar of the rectangle; and by examining Fig. 2 it will be seen that the hook part comes back squarely to the rectangular portion, and is joined thereto at points entirely inside of the shoulders *a*, the angle between the hook and the shoulders being a sharp rectangle, as shown in plan in Figs. 2 and 3. The shoulders *a* are formed upon the rectangular part entirely independently of the hook portion, and therefore I can provide a long or deep bearing-surface for the cams *b b'* without thickening the metal at any part, the link being in this respect unlike those in which the shoulder is formed upon the forward projecting hook portion of the link.

What I claim is—

1. A chain-link formed with a rectangular tooth-engaging portion having abrupt shoulders *a*, directly at the ends of the side bars, and a permanently-open hook, B, joined to the rectangular part inside of the said shoulders *a*, and having at the opposite end cams *b b'*, which extend around the bottom and the ends of the side bars, and extend also to points above the side bars, substantially as set forth.

2. A chain-link formed with a rectangular

tooth-engaging portion having abrupt shoulders *a*, directly at the ends of the side bar, and a permanently-open hook, B, joined to the rectangular part inside of the said shoulders, and having at the opposite end an end bar projecting above the upper faces of the side bars or above recesses or cut-away parts of said side bars, and cams *b b'*, the part *b* extending above the side bars and the part *b'* extending below the side bars, substantially as set forth.

3. A chain-link formed with a rectangular tooth-engaging portion having abrupt shoulders *a*, directly at the ends of the side bars, a permanently-open hook, B, joined to the rectangular part inside of the said shoulders, and a recess or sunken part at b^3, the inner or bottom wall of the recess extending farther in than the shoulders *a*, and having at the opposite end a bar, *d*, projecting above the side bars or above recesses or cut-away parts thereof, and cams *b b'*, extending below the side bars, around the ends thereof, and to points above them, substantially as set forth.

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

JOHN H. ELWARD.

Witnesses:

THEO. TYRER,

C. R. MINER.