W. EMMERSON.

Drive Chain.

No. 230,761. Patented Aug. 3, 1880.

Fig. 1.

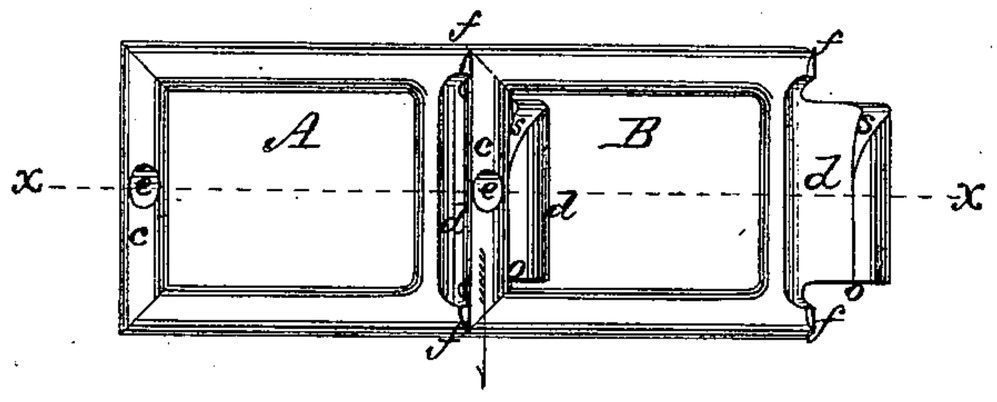


Fig. 2.

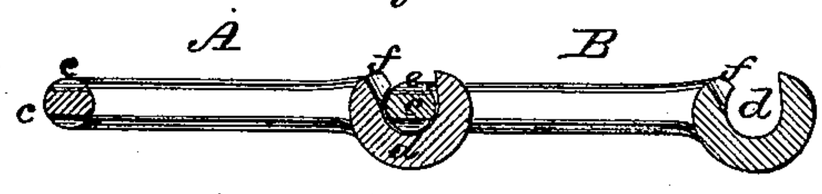


Fig. 3.

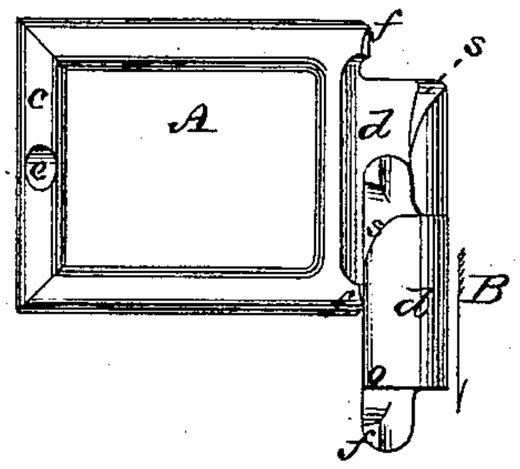
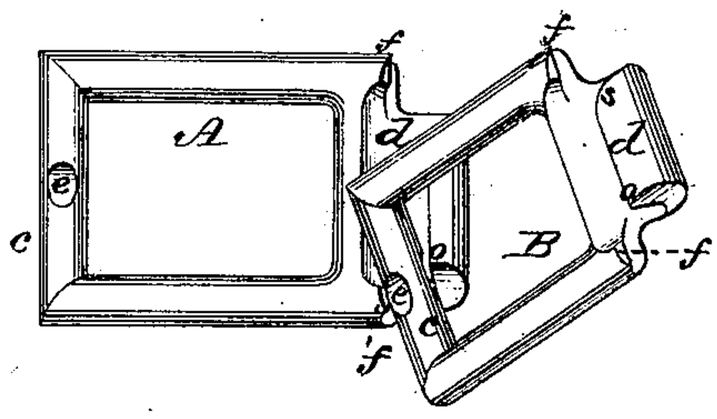


Fig. 4.



Witnesses:

E. Wolff

Jacob Felbel

Inventor:

William Emmerson

By atty.

J. N. McIntire

UNITED STATES PATENT OFFICE.

WILLIAM EMMERSON, OF CLEVELAND, OHIO.

DRIVE-CHAIN.

SPECIFICATION forming part of Letters Patent No. 230,761, dated August 3, 1880.

Application filed December 11, 1879.

To all whom it may concern:

Be it known that I, WILLIAM EMMERSON, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Drive-Chains; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

My invention relates to that class of drive-chains or chain-belts in which the parts are detachable at pleasure, and yet not liable to accidental separation during the use of the chain—such as exhibited, for instance, in the United States Letters Patent to W. D. Ewart, originally granted September 1, 1874, and reissued April 20, 1875; and my invention has for its main object to render this kind of drive-chain capable of more economic manufacture, and at the same time equally desirable if not better, in all the particulars of its construction.

To this main object my invention consists in a detachable drive-chain in which the hook-like coupler or socket-like device by means of which the links are articulated has its opening as large as or larger widthwise than the diameter of the end bar of a link adapted to be coupled with said coupler, and is provided with projections at the side of its opening opposite to its lip-like end, so that while the coupler may be cast without a core it is of such form that its hook-like portion and the said projections combined will prevent the escape sidewise of the coupled end bar through the said opening, all as will be hereinafter more fully described; and my invention further consists in a detachable drive-chain having a coupler-hook the opening in which is as large as or larger than the width of the end bar of the link, and which coupler-hook has the projections alluded to, and also has one end of its lip-like portion cut away, as hereinafter described, said chain also having the end bar of the link designed to engage with said coupler-hook made thinner at one point than elsewhere, so as to pass at said point between one end of the lip-like part of the hook and one of the projections alluded to, the structure of all the parts being such that after the passage of the said end bar into the said coupler its proper working position therein can be attained only by a sort of helical movement of said end bar within said hook, all as will be hereinafter more fully explained.

To enable those skilled in the art to make and use my invention, I will proceed to more fully describe the construction and operation of my improved detachable drive-chain, referring by letters to the accompanying drawings, in which I have shown, in various relative positions, two links of a chain embodying my said improvements.

I will here remark that, of course, two links such as shown might be multiplied to form a chain of any desired length, and that in lieu of duplicate parts, each composed, as shown, of an open link having cast on it at one end the hook-like coupler device, a series of alternate plain open links and connecting sections of separate and twin-like couplers may be employed for the composition of the chain, in which case the plain open links should, as a matter of course, have both end bars provided with depressions *e*, for the purpose already explained with reference to the one end bar shown in the drawings as having such depressions.

In the several figures I have designated the same part by the same letter of reference.

As shown, my improved chain is composed, by preference, of duplicate links A B, which, when in a working condition, are hinged or articulated, as seen at Figures 1 and 2, by reason of the embracement of the end bar, *c*, of each link by the hook-like coupler device *d* of each link.

The said end bar, *c*, is made, as shown, of about the same shape and size in cross-section as the side bars of the link, and both these portions are, by preference, about cylindrical in form; but the said end bar, *c*, has a thin place, as seen at *e*, effected by depressions on opposite sides, the purpose of which will be presently explained. This thin portion, it will of course be understood, may, if desired, be accompanied by a cut-away or depression at one side only of the end bar, instead of at two opposite points, as shown, and it may be located elsewhere than at the middle, endwise of the bar *c*, if desired.

Near the root of the hook-like device *d* are formed two projections, *f f*, which, as seen, are located about in line with the side bars of the

link, and which project toward the lip-like end of the hook, but outside of the line of it; and, as shown at *s*, one end of the lip-like portion of hook *d* is cut away on a curve, while the opposite end is left square or corner-like, as seen at *o*, the purposes of which formation or shape will be presently explained.

The structure of the parts and the manner in which they work together are so well exhibited by the drawings at Figs. 1 and 2 that little more description seems necessary upon these points; but I will now proceed to explain, by reference to these and the other two figures of the drawings, the method of detaching and coupling the parts, and, incidentally to such explanation, will further describe the peculiarity of the parts illustrated.

Supposing the links A and B, made as hereinbefore described and as shown in the drawing, to be coupled together in a working condition, as seen at Fig. 1 in top view and Fig. 2 in longitudinal section, taken at the line *x x* of Fig. 1, to detach or uncouple them it will be necessary to turn the link B on the axis of its hinged bar *c* in the direction indicated by the arrow at Fig. 2, and at the same time move it sidewise relatively to the link A in the direction indicated by the arrow at Fig. 1 until the plane of the link B shall have been moved at least far enough to be at right angles to that of link A. By this double movement of link B, or the two links relatively, which resolves into a sort of helical movement of said link about an imaginary line which is coincident with the axial line of the hinge-like connection between the links, the parts are brought into a relative position, in which the end bar, *c*, of link B may be slid along endwise within the coupler-hook *d* to the position, for instance, seen at Fig. 3, in which position the thin place *e* of said end bar will be contiguous to narrow space between the square or corner-like end *o* of the lip-like part of the coupler and the nearer one of the two projections *f*. While in this relative position, if the link B be moved with a peculiar motion, which perhaps may be best described as a sort of twisting movement, about a line running centrally and lengthwise of the link into about the position seen in Fig. 4, the two links A B may be entirely disconnected or uncoupled. Of course, the inverse of the just-described manipulation will reunite or couple together the two links.

It will be observed that in a chain having the coupling of the parts effected by means substantially such as shown and described there is only one relative position in which the parts can be disunited, and that to get them from a working position to that in which the uncoupling can occur very peculiar and quite intricate movements must occur, while at the same time there is no difficulty in purposely disuniting the parts.

It will also be observed that in my improved chain, while the parts are capable of the same degree of strain and wear as in the best prior chains of the same class, and any accidental detachment of the parts is no more liable to occur, the conformation and principle of construction of the coupling means are such that the coupler can be cast without the expense of coring, which is necessary in cases where the hook or curved portion of the coupler extends round more than half a circle. When in a working position the structure of the parts is such that the whole width of the hook portion *d* bears against the end bar embraced by it, and that part of the surface of the end bar on which the strain and wear come is practically cylindrical, smooth, and unweakened.

The presence of the projections *f f*, which, in connection with the hook portion *d* of the coupler, operate to partially clasp the end bar, *c*, from different directions, prevents the parts (the two links) from acquiring, by a merely hinge-like movement about their axes of jointure, any relative position in which, by a subsequent sidewise movement only, the parts can come to a relation in which the final uncoupling movements could occur; and it is therefore by the peculiar helical initial movement which I have explained that the parts can move out of the working position toward a relationship suitable for the subsequent movements necessary to a detachment of the links.

Having now so fully explained the nature of my improvements and the construction and operation of a chain embracing them that any one skilled in the art can understand my invention and practice it, what I claim as new, and desire to secure by Letters Patent, is—

1. A detachable drive-chain coupler-hook the opening of which is sufficiently large widthwise to permit the introduction and withdrawal of the plain end bar of a chain-link, and which has combined with it projections substantially such as described, and which operate to necessitate a cut-away or depression in said plain end bar to permit its introduction into said coupler-hook, and which also operate to prevent a link engaged with said coupler-hook from turning far enough backward to allow the passage of the side bar laterally through the hook-opening.

2. A detachable drive-chain coupler the hook-like portion of which has one end only of its lip curved off, as specified, and which is provided with projections substantially such as described at either side, all as set forth.

3. A detachable drive-chain the coupling-hook of which is made with an opening equal to or greater than the width of the end bar embraced by it, with projections at either side, as described, and with one end of its lip curved off, as specified, and the end bars of each link of which chain are made with a cut-away or thin place, as specified, the whole operating substantially as set forth.

In testimony whereof I have hereunto set my hand this 8th day of December, 1879.

WILLIAM EMMERSON.

In presence of—

HENRY GOLDSMITH,

WM. G. GRIFFITH.