

W. D. EWART.  
Drive-Chain.

No. 225,113.

Patented Mar. 2, 1880.

Fig. 1.

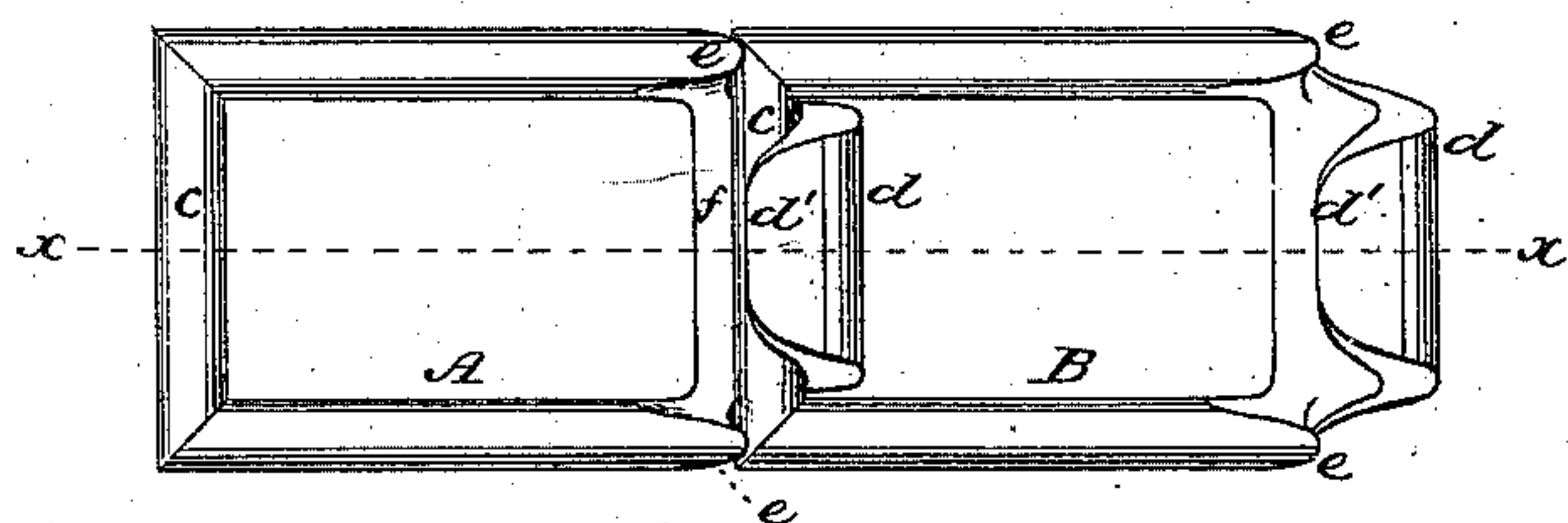


Fig. 6.

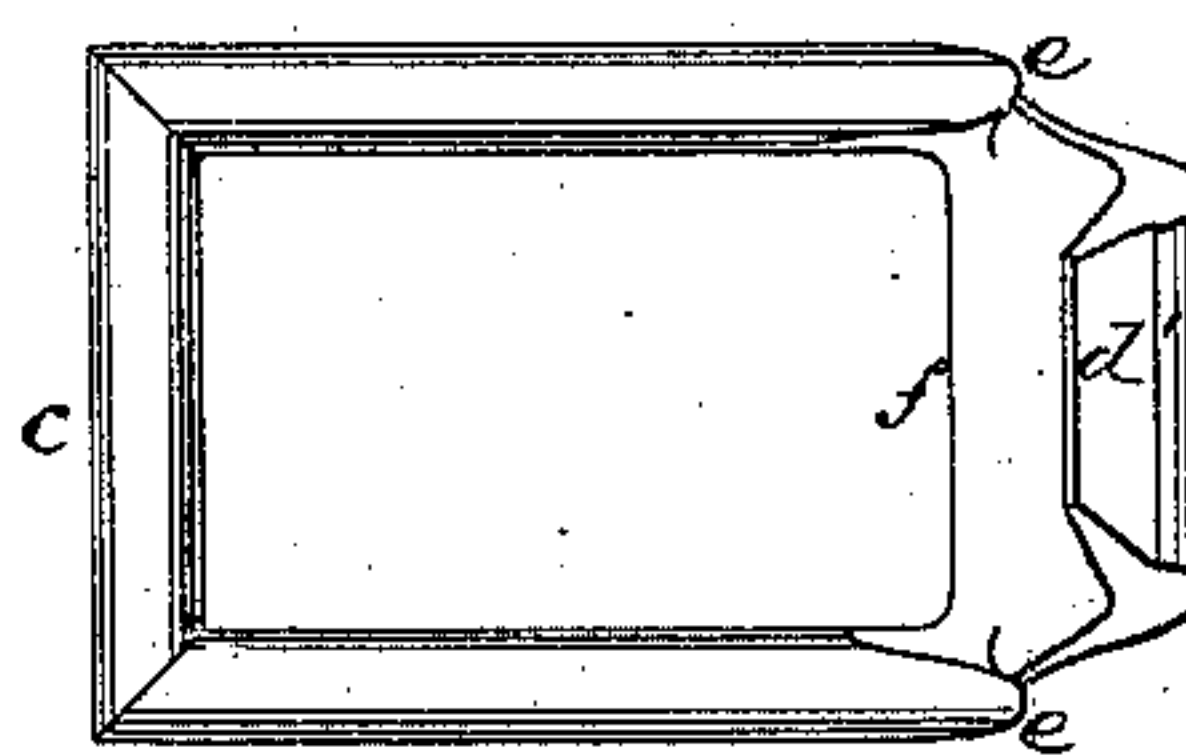


Fig. 2.

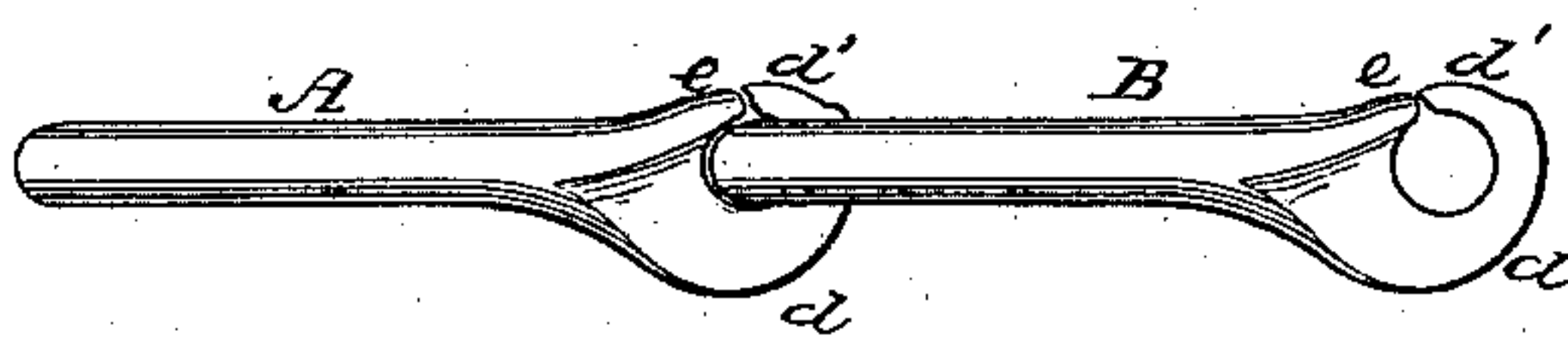


Fig. 7.

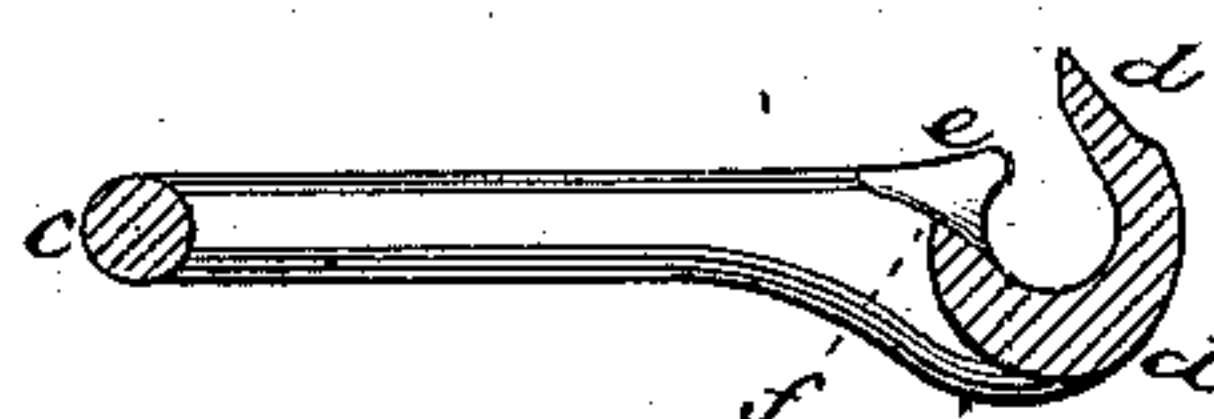


Fig. 3.

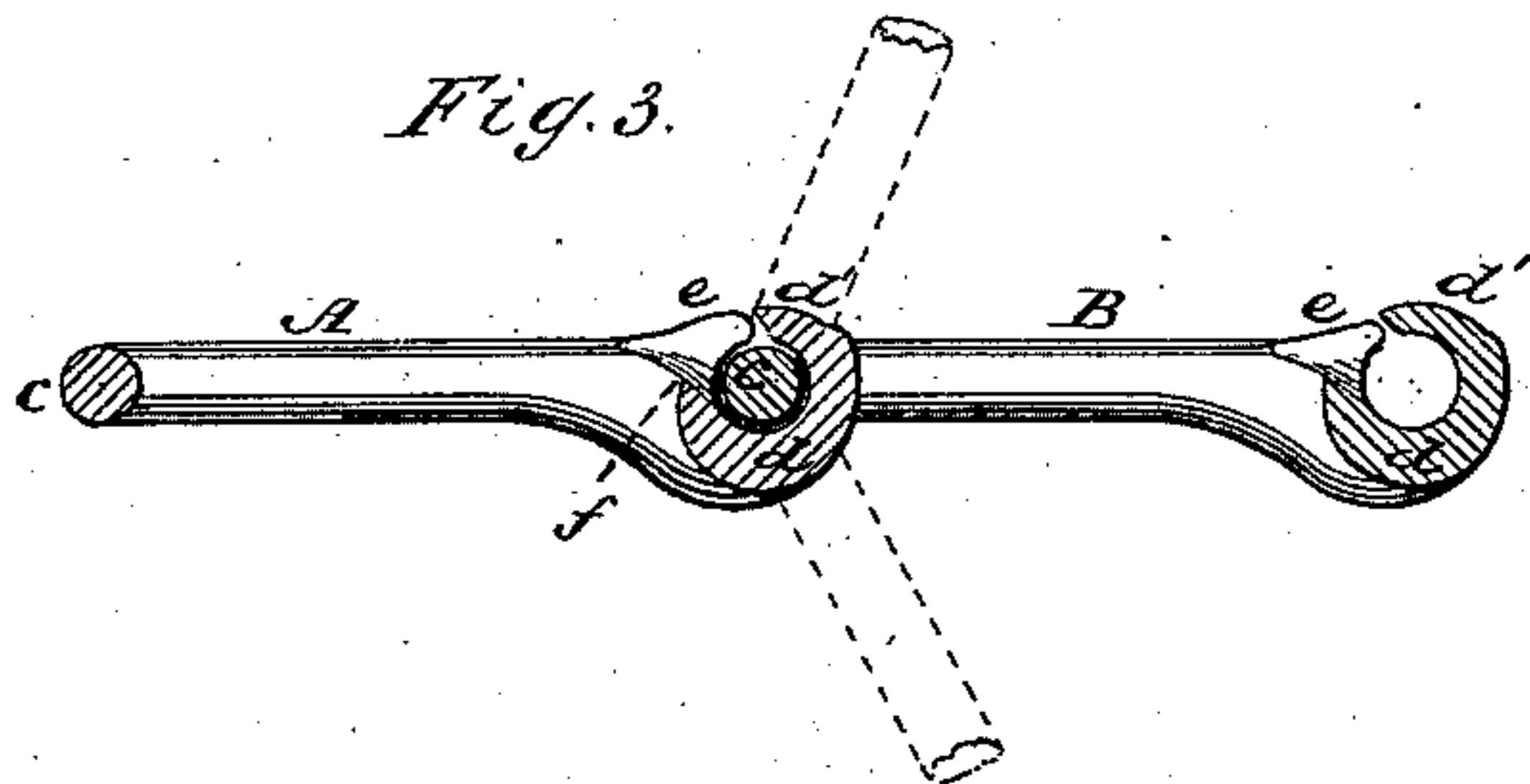


Fig. 4.

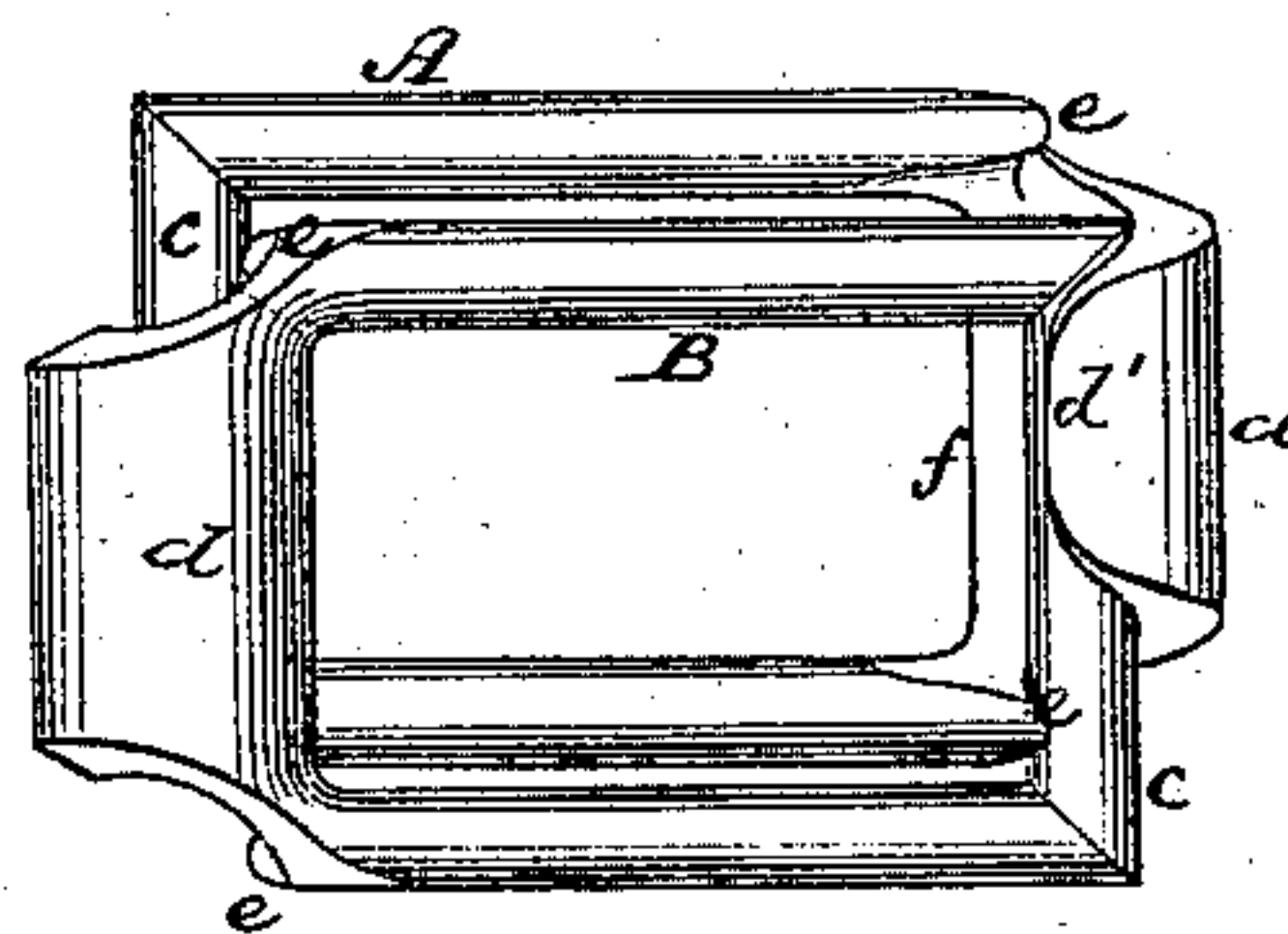
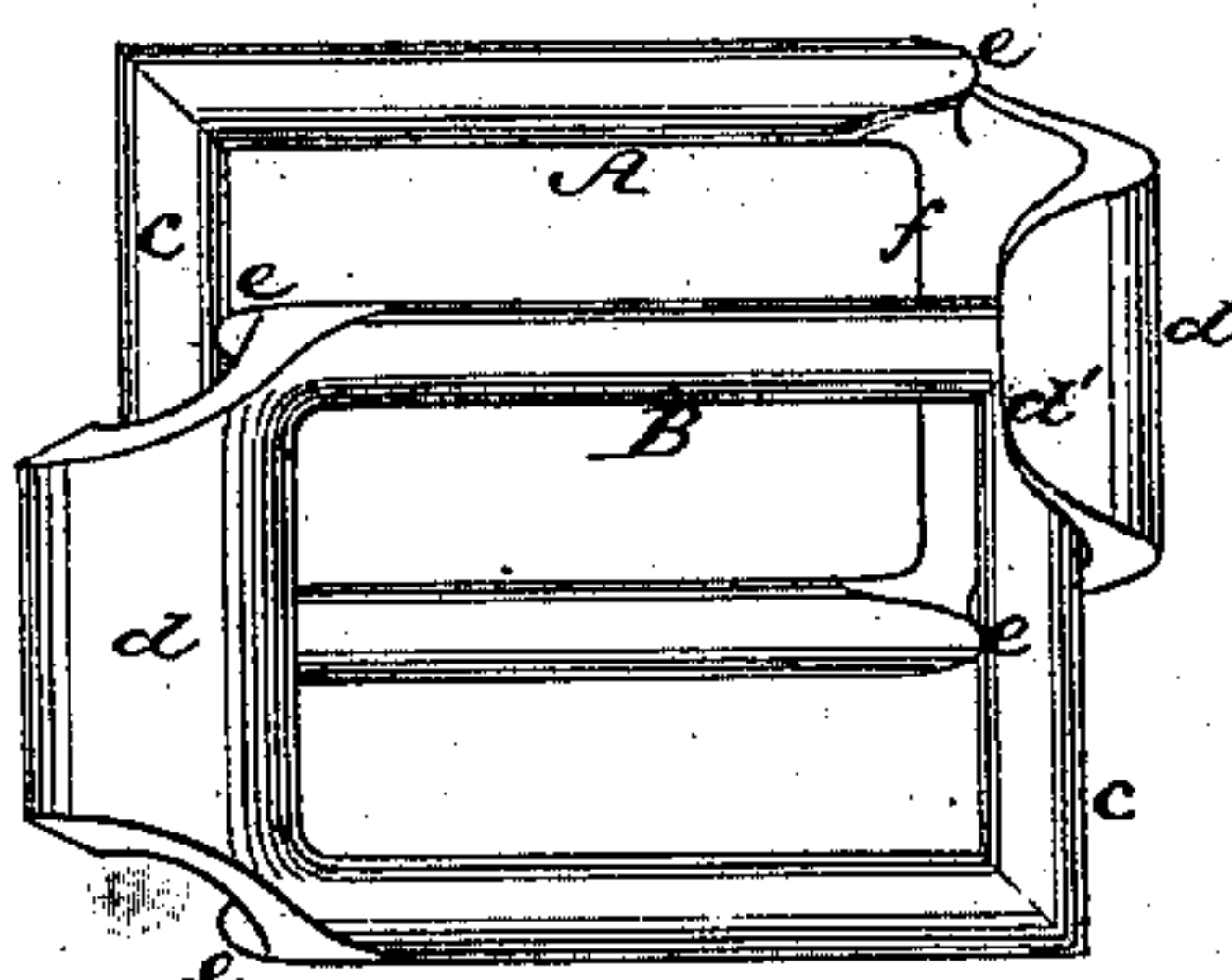


Fig. 5.



Witnesses:

E. Woff.  
Jacob Felbel.

Inventor:

W. D. Ewart  
By atty.  
J. N. Mc Intire.



# UNITED STATES PATENT OFFICE.

WILLIAM D. EWART, OF CHICAGO, ILLINOIS.

## DRIVE-CHAIN.

SPECIFICATION forming part of Letters Patent No. 225,113, dated March 2, 1880.

Application filed November 29, 1879.

*To all whom it may concern:*

Be it known that I, WILLIAM DANA EWART, of Chicago, in the county of Cook and State of Illinois, 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 a new and useful improvement on that kind of drive-chains or chain-belts in which the parts composing the chain, though capable of separation designedly, (by turning them into an unusual relative position,) are not liable to casual detachment when the chain is in a working condition; and has for its main objects to simplify the construction of such chains, and at the same time render them exceedingly durable and economic of manufacture.

Previous to my present invention the kind of drive-chain alluded to has been known in the art, and has been extensively manufactured, in this country principally, according to and under Letters Patent of the United States originally granted to me on the 1st day of September, 1874, and numerous subsequent patents have been granted for various modifications of the detachable drive-chain made the subject of my said patent; but in the form of detachable chain shown and described in my said patent, and in most or all of the forms shown in later patents and known to me, the structure of the coupling hook-like device has been such that one of two objections existed in it—viz., either the hook-like device (which constitutes in this kind of chain the socket or articulated joint between the coupled parts) necessitated the use of a core in casting, which, of course, involves a certain amount of expense in the manufacture, or, when cast without a core, had to be subsequently bent to its final form to complete the manufacture, which bending, by reason of occurring necessarily at a point or line where the device has to bear considerable strain and wear, rendered the coupling device or hook very liable to break or give way in the use of the finished chain.

I propose to entirely overcome these difficulties by my present invention, which consists, primarily, in a detachable drive-chain the

hook-like coupling device or portion of which is of a form such that, though it may be cast without a core, it will, when subsequently bent over at its lip-like part, (into final shape, for the purpose merely of rendering the parts of the chain less liable to accidental detachment,) have the point or line at which the bend has been located above or beyond the locality at which the longitudinal strain on the parts occurs when the chain is working, as will be hereinafter more fully explained; and my invention further consists in a detachable drive-chain in which the hook-like coupling device or articulating socket-piece has combined with that part of it which clasps the end bar of an adjacent link, and on which the pull or strain comes, projections, which are located on either side of said part widthwise of the coupling, and which co-operate with the said part to wholly or nearly surround, though at different points during its length, the end bar of the link held within the coupler, the conformation of all parts of the coupler device being such that the end bar of an open link may be introduced within and removed from the embrace of the coupler by a sort of intertwining of the parts to be coupled or detached, as will be hereinafter more fully explained.

To enable those skilled in the art to make and use my improved detachable chain, I will proceed to more fully describe its construction and operation, referring by letters to the accompanying drawings, in which—

Figure 1 is a top or plan view of two links of a chain embodying my invention. Fig. 2 is an edge or side view of the same. Fig. 3 is a longitudinal vertical section, at the line *xx* of Fig. 1, of the same. Fig. 4 is a top view showing one of the links turned over onto the other and moved slightly sidewise. Fig. 5 is a similar view of the same parts, but with the turned-over links moved farther sidewise, the two last-mentioned figures illustrating the mode of uncoupling the parts in the manner to be presently explained. Figs. 6 and 7 are, respectively, a top view and longitudinal central vertical section of one of the links before the completion of the chain, and in the form in which, by preference, the links are cast.

In the several figures the same part will be found designated by the same letter of refer-



ence, and as the various figures very clearly illustrate the construction of my improved detachable chain, unnecessary prolixity in the specification will be avoided by proceeding herein at once to an explanation of the mode of operation of the devices shown.

It will be seen, by reference to Figs. 1 to 5, inclusive, of the drawings, that the articulated open (or sprocket-wheel) links, which, as shown, are duplicates, are jointed or hinged together by the partial (or entire) encirclement of the end bar, *c*, of each link by the coupling device *d* of the link attached to said end bar, and that when the parts of the chain are thus articulated the jointed links are capable of relative movement in the directions and to about the extent illustrated by the dotted lines at Fig. 3, which character and extent of motion of the links relatively give to the chain the requisite flexibility for all the necessary purposes of drive-chains or chain-belts.

The lip-like parts *d'* of the finished chain, it will be seen, extend well around the coupled end bars, *c*, while the projecting and curved points or portions *e e* of each coupler extend partially around each of said end bars in an opposite direction, so that by these portions *e e* and the main portions *d* and *d'* of the coupler each end bar, *c*, is almost or quite encircled (though at different points in its length) where it is articulated with the adjoining link; and it will be seen (from the figures last above referred to) that the conformation of the coupling device, or of that portion of each link which embraces or clasps the end bar of an adjoining link, is such that the open spaces between the ends of the main hook portion *d* and each of the curved projections *e e* present helical figures, so that in the passage of either side bar through either of these spaces, (in engaging or disengaging the links,) the relative movement of the link being detached must be in a helical direction, the axial line of the coupled end bar constituting the center of motion about which the relative movement of the parts occurs.

When either side bar of a link shall have been moved through one of these helical openings or spaces of the coupler, by bringing the two coupled links into the relative position illustrated at Fig. 4, one link may be then slid along on the other, or may be moved side-wise relatively to the other, as illustrated at Fig. 5, the side bar, which was previously moved through the helical space, then moving through the straight (and slit-like) open space between the edge of lip *d'* and the immediately-opposite edge of the partially-cylindrical receptacle of the coupler.

After the parts shall have been placed relatively as seen at Fig. 5, they may be wholly disengaged from each other by a continuation of the sliding movement just explained and a final slight helical or turning motion, (in an opposite direction to the first-described turning of the parts.)

It will, of course, be understood that by an operation or manipulation of the parts the inverse of that just explained the parts shown may be re-engaged or coupled together, and that, though I have shown, by preference, a form of chain embodying my invention, in which only duplicate parts are employed, a chain may be made involving the same principle of construction and mode of operation, with alternate plain open links and connecting or coupling sections or couplers, the latter either solid or open, as may be deemed expedient, and as may be permissible with the sprocket-wheels on which the chain may be designed to be used.

It will be observed that by making the coupler device with the innermost edge or root of its housing or receptacle considerably below the plane of the top of the link, as seen at *f*, I am enabled to produce said device in a form in which the opposite edge of said housing—i. e., the edge of lip *d'*—may be extended farther over the topmost part of the end bar, *c*, than it otherwise could be, and at the same time leave a sufficient space between the edge of lip *d'* and the root or portion *f* of the coupler for the free passage between these parts of a side bar of a link in the necessary and just previously explained operations of detaching and coupling together the parts of the chain; and it will be understood that by thus shaping and devising the coupler I am enabled to cast it in the form shown at Figs. 6 and 7 without the use of any core, and at the same time have the lip-like extension *d'*, which is subsequently bent (into the condition seen in the other five figures of the drawings) to finish the chain, located so high and so far over relatively to the end bar of the clasped link that little or no strain or wear can come on that part of the coupler which may possibly have been weakened by the bending operation, the effect thus being, in substance, the production of a chain in which the parts subjected to wear and strain are equally strong with the corresponding parts of a chain the castings of which are molded in final form, and in which the said parts are of such shape as render the coupled devices as little, if not less, liable to accidental separation, while at the same time all the trouble and expense of coring are avoided.

The bent-over lip-like portion *d'*, performing, in conjunction with the extensions *e e*, merely the office of nearly or quite encircling the end bar, *c*, of a link, in order to prevent any casual detachment of the parts of the chain, does not require to be very strong or durable, and hence any weakening of this part of the device by the bending of it into its final position is no detriment, practically, to the chain; but that portion of the coupler-hook which needs to be strong and durable is really cast in permanent or final form. Thus the chain, while possessing in an eminent degree all the requisite qualities of a good one, may be made



cheaper than an equally-good one which requires the use of cores in the manufacture of its coupling devices.

By the combined offices of the main clasping portion and the supplemental and partially-encircling portions *e e* of the coupler, the end bar, *c*, is so far surrounded circumferentially as to render any accidental removal of it from the coupler quite improbable during the usual uses of the chain, while at the same time, by the described manipulations of the parts, they may be purposely separated with perfect ease; and it will be seen that this peculiarity of my improved chain is not dependent upon the presence in the chain of what I have explained as constituting another feature of my invention, since said peculiarity might be embodied in chain in other respects unlike the one I have shown and described.

If, in handling or otherwise using the chain, two adjacent links should be allowed to assume the relative positions illustrated at Fig. 3 by link A and the uppermost dotted in position of link B, and link A should then turn farther and move slightly sidewise in the direction necessary to effect a disengagement, a subsequent straightening out of the chain would necessitate a return of the parts (by the sort of helical movement already explained) to their proper relative positions.

Having so fully explained the nature of my invention and the structure and operation of my improved chain as to enable those skilled in the art to fully comprehend the former and make and use the latter, what I claim as new is—

1. A detachable drive-chain the coupler device of which has its slot-like opening located partially below and in a plane at an angle to the plane of the top of the link portion thereof, and has a bent lip-like portion, the construction being such, as described, that, while the coupler device may be cast without coring, the bent portion is all located above the part on which the wear and strain comes.

2. A detachable drive-chain in which the coupler device has a main clasping or hook-like part, *d d'*, and oppositely-projecting supplemental retaining devices *e e*, arranged on either side of the main hook, the construction being such, as described, that the plain end bar of a link can be engaged with and disengaged from the coupler only by a sort of intertwining movement of the parts, as set forth.

In testimony whereof I have hereunto set my hand this 25th day of November, 1879.

WILLIAM D. EWART.

In presence of—

SAMUEL M. HENDERSON,  
GEO. WOLFRAM.