

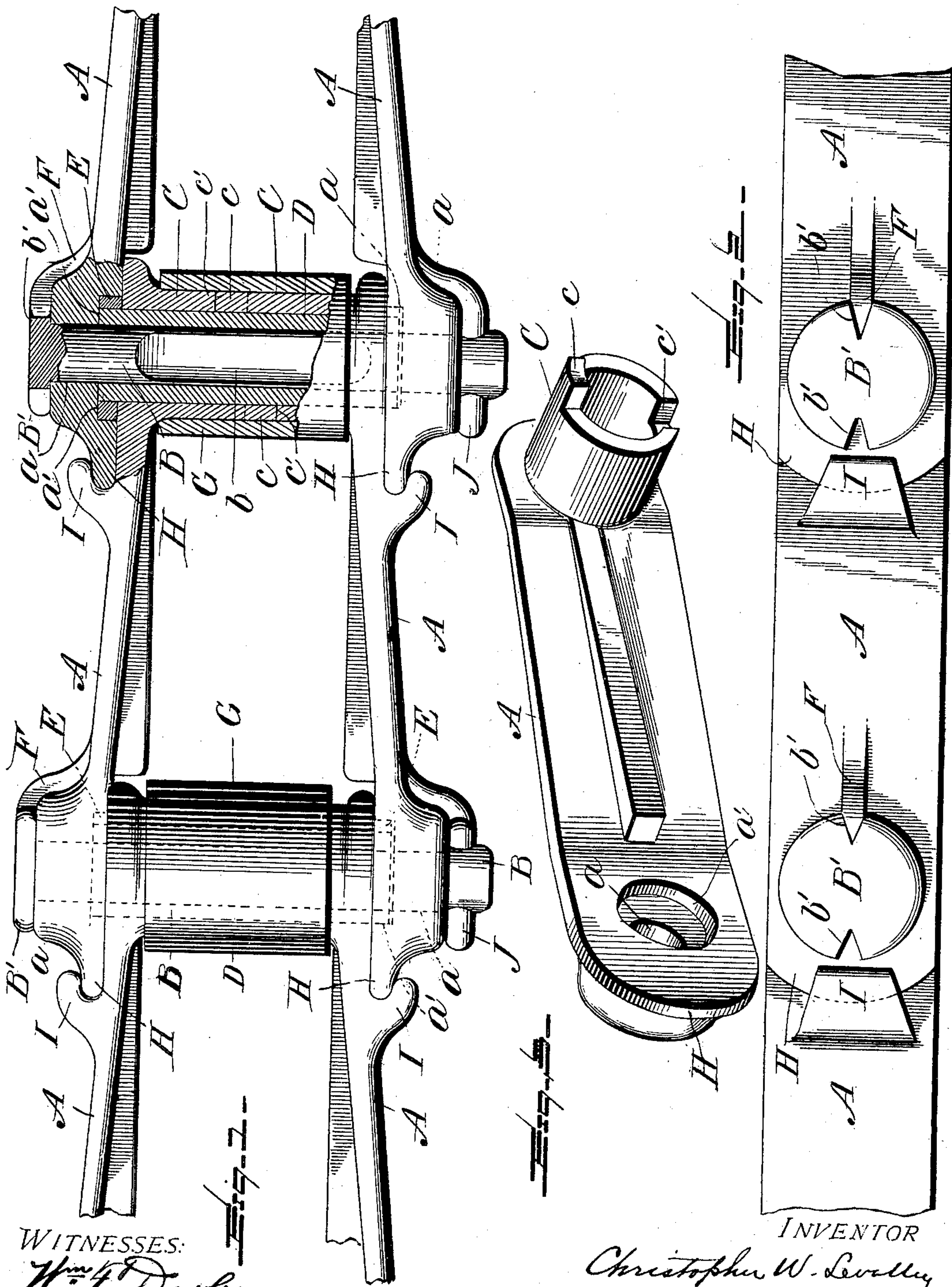
No. 706,427.

C. W. LEVALLEY.
DRIVE CHAIN.

Patented Aug. 5, 1902.

(Application filed June 11, 1901.)

(No Model.)



WITNESSES:

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DRIVE-CHAIN.

SPECIFICATION forming part of Letters Patent No. 706,427, dated August 5, 1902.

Application filed June 11, 1901. Serial No. 64,157. (No model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER W. LEVALLEY, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Drive-Chains, of which the following is a specification.

My present invention relates to sprocket or drive chains, consisting of separate articulated links; and it has for its object to produce an improved chain of this character in which the parts which are subjected to greatest wear may be removed when worn out and replaced by new parts, it being possible, by means of my present invention, to remove an old and worn chain, restoring it to practically the working conditions of a new chain by the replacing of a few simple parts.

In the drawings, Figure 1 is a top plan view of a short section of a drive-chain embodying my improvements, one of the joints being represented partly in horizontal section. Fig. 2 is a side elevation of a section of the chain. Fig. 3 is a perspective view of one of the side bars detached.

In the drawings, A A represent the side bars of a drive-chain. These side bars are duplicates of each other, and each is provided at one end with an aperture *a*, constituting a seat for the cross bolt or pin B employed to unite the links of the chain. The opposite end of the side bar is provided with an inward-extending tubular portion C, which constitutes a part of the end bar of the link. The length of the tubular portions C is such that when the side bars are properly assembled to form the chain-links the tubular portions of the oppositely-arranged side bars abut end to end, the dividing-line between the two parts of the end bar thus formed being in the central longitudinal vertical plane of the chain. In order that the two tubular portions of the end bar of the link shall be properly held in line with each other, I preferably form them with interlocking projections. Thus each tubular end portion is provided upon one side with a projection *c*, adapted to register with a recess *c'* in the opposite tubular end bar, and upon the opposite side with

a recess which engages a corresponding projection carried by the other end bar.

D represents a bushing, preferably of hardened steel, which fits tightly within the hollow end bar formed by the tubular parts C C just described. This bushing is longer than the end bar of the link, so that its ends extend beyond the outer faces of the side bars and constitute hubs which enter recesses *a'*, formed therefor in the inner faces of the side bars. These projecting hubs preferably engage with steel wearing-rings E, seated in the recesses *a'*. The connecting bolt or pin B extends through and has a wearing engagement with the bushing D.

The form of cross-bolt which I prefer to use is one in which the central portion is cut away to form oil-cavities, as represented at *b*, and which is provided with a head B', formed with recesses *b'*, with which a lug F, carried by one of the side bars, is adapted to engage in order to prevent the bolt from rotating relative to the side bars. The bolt B serves also to prevent the side bars from spreading at their free ends, a pin or split key J, which passes through the bolt, being employed in conjunction with the head B' for this purpose.

G represents a sleeve, preferably made of hardened steel, which fits over the hollow divided end bar C. This sleeve is not an antifriction-roller, free to turn upon the end bar, but rather fits tightly thereon, being first driven onto one section C, after which the other section of the side bar is driven or forced into the sleeve. It constitutes a wearing-surface with which the sprocket-teeth of the wheels over which the chain is run engage.

Each of the side bars is provided at one end with a flange H, which is adapted to lie inside of or behind a confining-lug I, carried by the side bar of the adjacent link. The interlocking of the flange H and confining-lug I prevents the separation or spreading of the side bars.

It will be seen that in a construction such as I have described the main wearing-surfaces at the joints of the chain are of steel and are formed simply of pieces of tubing, which may be easily replaced after they have become

worn out. It is understood by all familiar with the use of sprocket-chains or chain-belt gearing that the wear is not uniform, particularly if the chain is run constantly in one direction. In a construction such as I have described it is possible, when the parts have become badly worn, to turn the bushing D either a quarter or a half revolution and to turn the sleeve G in the same way, thus presenting new wearing-surfaces without necessitating the replacing of any parts. The replacing of parts can, however, be easily effected when it becomes necessary, and thus the chain rendered practically as efficient as when new and without requiring the use of new side bars.

In the manufacture of this chain the side bars and the tubular portions C thereof, which are arranged to constitute hollow end bars, are formed of cast metal, while the exterior and interior wearing-surfaces of the end bars are formed of steel.

I believe that I am the first to have produced a chain having links with side bars and hollow end bars of cast metal, both the exterior and interior wearing-surfaces of which latter are of steel, by which construction I am able to avail myself of the cheapness of cast metal for the heavier parts of the chain and the strength and durability of steel for those portions which are subject to wear by their engagement with moving parts.

It will be observed that the separate side bars and the tubular end portions C, carried thereby, are held securely together by the tight-fitting internal wearing-sleeve, which operates not only as a bushing or wearing-lining for the hollow end bar, but also as a connection to hold together the separate side bars. The sleeve is, as has been stated, tight-fitting, so that the side bars will not separate or be accidentally moved relative to each other after the sleeve has been properly inserted. The external wearing-sleeve G serves the same purpose as the internal sleeve D in holding the side bars together, it having, as hereinbefore described, a tight-fitting engagement with the tubular members C of the chain-link. When both sleeves D and G are employed, the opposite side bars and tubular members C are held together by a double connection, which holds them together with great rigidity, but permits of their separation, should it be desired to remove and replace either one or both of the sleeves.

The connecting pin or bolt may be inserted from either side, and it may be turned a half-revolution when it becomes worn on one side.

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

1. A chain formed of links having side bars and hollow end bars of cast metal, and interior and exterior wearing-sleeves of steel for the end bars, substantially as set forth.

2. A chain formed of links having side bars

and hollow end bars of cast metal, the side bars of each link being separate from each other, and interior and exterior wearing-sleeves of steel for the end bars, substantially as set forth.

3. A chain comprising links having side bars and divided hollow end bars carried by the side bars, and tubular connecting parts having tight-fitting engagement with the divided end bars arranged to rigidly connect the opposite side bars, substantially as set forth.

4. In a chain, the combination with the side bars, the divided tubular end bars carried by the side bars, removable bushings fitting tightly within the end bars and uniting the opposite side bars and cross-bolts extending through the side bars and end bars and uniting the adjacent links, substantially as set forth.

5. In a chain, the combination with the side bars, the divided tubular end bars carried by the side bars, the removable bushings within the tubular end bars and having their ends extended outward and arranged to have interlocking engagement with the side bars, and means for preventing the side bars from spreading laterally, substantially as set forth.

6. In a chain, the combination of the side bars, each bar being provided with an inward-extending tubular portion C, such tubular portions of the opposite side bars being arranged to be brought together, end to end, to form a hollow or tubular end bar, and a sleeve adapted to fit tightly over the said tubular portions C, and rigidly hold them together and also to constitute wearing-surfaces for the sprocket-teeth to engage with, substantially as set forth.

7. In a chain, the combination of the side bars provided with inward-extending tubular portions C, such tubular portions of the opposite side bars being arranged to be brought together, end to end, to form hollow tubular end bars, bushings fitting tightly within the said hollow end bars, and arranged to constitute internal wearing-surfaces for the end bars, and also to rigidly connect and hold together the opposite side bars, connecting bolts or pins arranged to unite adjacent links and have wearing engagement with the said bushings, and means for preventing the connecting-bolts from rotating relative to the side bars through which they pass, substantially as set forth.

8. In a chain formed of articulated links, the combination of the side bars of the links, the divided end bars carried by the side bars and formed with interlocking parts, the sleeves fitting the end bars tightly and arranged to unite and rigidly hold together the parts of the divided end bars and the opposite side bars, and means for connecting the links at the joints of the chain, substantially as set forth.

9. In a chain, the combination of the side bars each provided with an inward-extending

tubular portion C, the tubular portions of opposite side bars being arranged to be brought together, end to end, to form hollow or tubular end bars, bushings D fitted tightly within
5 the hollow end bars, sleeves G fitted tightly upon the exterior of the said end bars, the said bushing and sleeves constituting interior and exterior wearing-surfaces of the end bars, and operating to unite the opposite side

bars, and connecting cross pins or bolts which 10 pass through the side bars and the end bars and unite the links at the joints thereof, substantially as set forth.

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Witnesses:

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