No. 811,391. PATENTED JAN. 30, 1906.

# W. H. GATES.

## DRIVE CHAIN.

APPLICATION FILED MAY 14, 1903.

Fig. 1

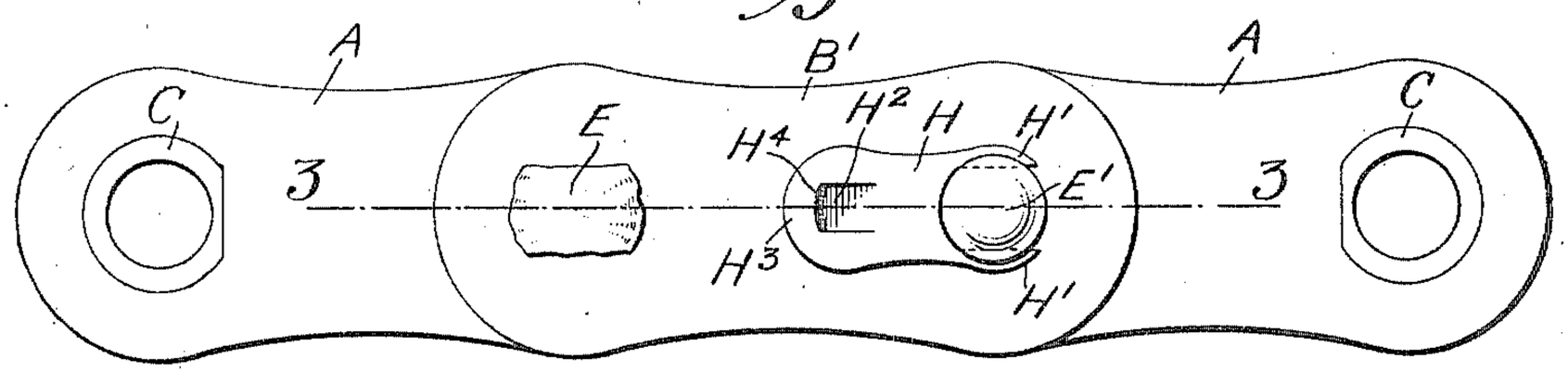



Fig. 2.

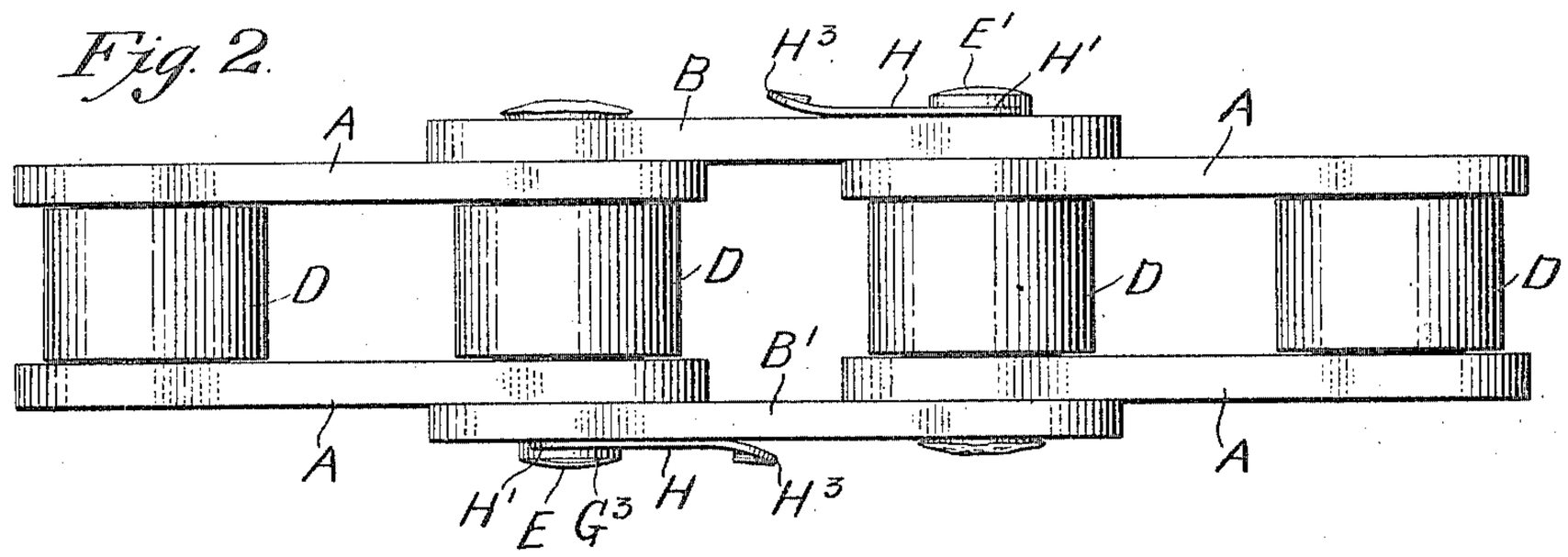



Fig. 3.

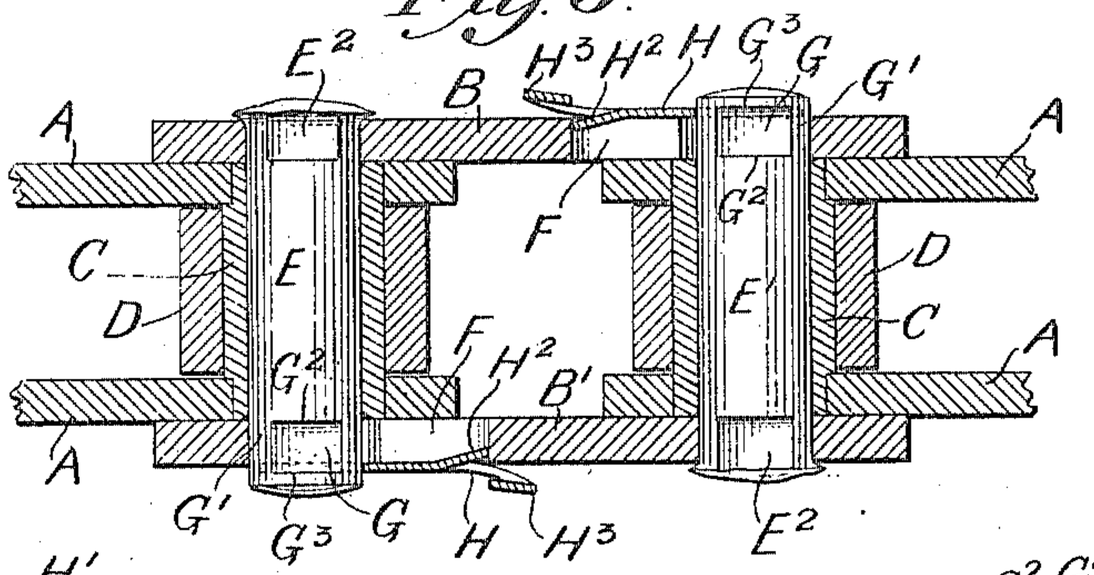



Fig. 5.

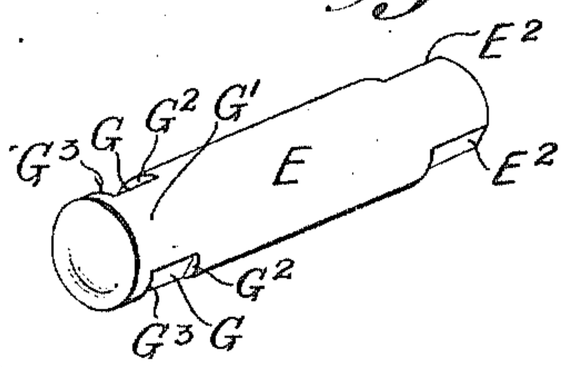



Fig. 6.

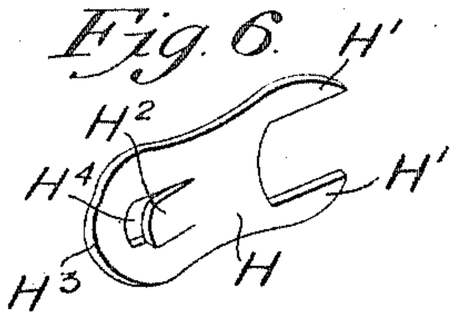
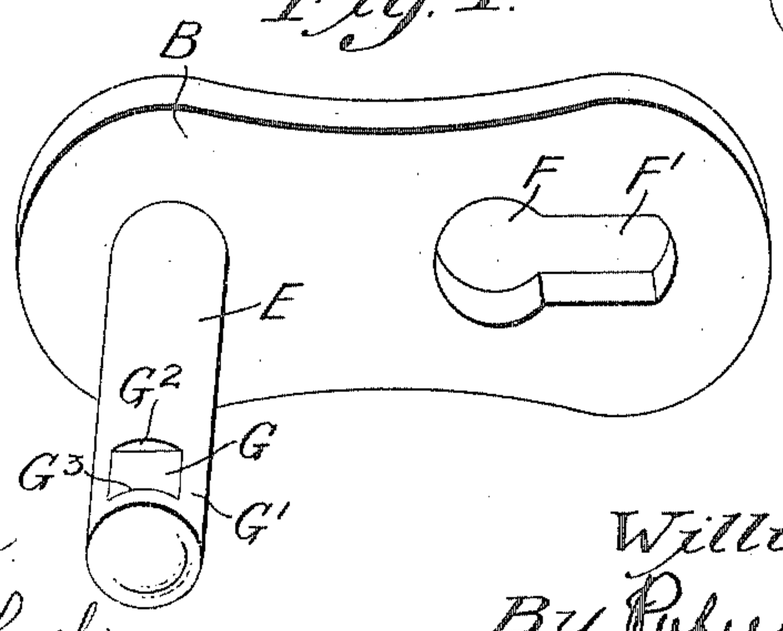



Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## DRIVE-CHAIN.

No. 811,391. Specification of Letters Patent. Patented Jan. 30, 1906.

Application filed May 14, 1903. Serial No. 157,035.

*To all whom it may concern:*

Be it known that I, WILLIAM H. GATES, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Drive-Chains, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 is a side elevation and portion of a drive-chain embodying my invention. Fig. 2 is a top view of the same. Fig. 3 is a sectional view on line 3 3, Fig. 1. Fig. 4 is a perspective view of one of the side links with its attached pivotal pin. Fig. 5 is a perspective view of one of the pivotal pins detached from its side link, and Fig. 6 is a perspective view of one of the locking-plates by which the side links are held from longitudinal movement on the pivotal pins.

Similar letters of reference refer to similar parts in the different views.

The object of my invention is to secure a drive-chain in which the component parts are easily separable when desired and to provide means by which they are securely held together when the chain is in use; and it consists in the construction and arrangement of parts, as hereinafter described, and pointed out in the annexed claims.

In the accompanying drawings, A A denote the center links, and B B′ the outer or side links, of a drive-chain embodying my invention. The center links A A are arranged in pairs, with each pair connected at their ends by the hollow pins or barrels C, Figs. 1 and 3, upon which are supported the rollers D, which engage the teeth of a sprocket-wheel. Each adjacent pair of center links A A are connected by a pair of side links B B′ by means of pivotal pins E E′, which connect the ends of the side links upon opposite sides of the chain and pass through the barrels C. Each pair of side links are thus connected by a pair of pivotal pins, which passing through the barrels C form the pivots of the hinged joints between the side links B B′ and the center links A A.

The pivotal pins E E′ are flattened at one end on opposite sides, as at $E^2$ $E^2$, Fig. 5, and the flattened ends are inserted in correspondingly-shaped holes in the side links and are riveted therein, the pivotal pin E being riveted in one end of the side link B and the pivotal pin E′ being riveted in the opposite end of the side link B′. Each of the side links therefore has riveted in one of its ends a pivotal pin, and at the opposite end of the side link is a hole F of sufficient diameter to receive the end of the pin. The link also contains a slot F′, communicating with the hole F, slightly narrower than the diameter of the hole. The free ends of the pivotal pins have segments removed on opposite sides, as at G G, Fig. 5, forming a flattened neck G′, with shoulders $G^2$ $G^2$ and $G^3$ $G^3$. In assembling the center and side links of the chain the center links are brought together near enough to allow the pivotal pins E E′ to be inserted through the barrels of the center links and through the holes F of the side links until the necks G′ of the pins are brought into alinement with the slots F′ of the side links. The necks G′ are then drawn into the slots by the separation of each adjacent pair of center links by a movement corresponding to the line of tensile strain when the chain is in use. When the necks G′ of the pivotal pins are drawn into the slots F′ of the side links, the side links are held from sidewise removal by the shoulders $G^3$, and the separation of the side links from the center links is prevented so far as tensile strain is applied to the chain.

In order to prevent the accidental displacement of the side links from the center links when the chain becomes slack, I employ a locking-plate H, as shown in perspective view in Fig. 6, having at one end the prongs H′ H′, fitted to slide over the necks G′ of the pivotal pin between the side link and the shoulders $G^3$, and near the opposite end is an inwardly-turned prong $H^2$, adapted to enter and abut against the side of the hole F. The end $H^3$ projects a short distance over the side link and is slightly raised therefrom to allow the end of the locking-plate to be lifted away from the side link sufficiently to remove the prong $H^2$, when the locking-plate may be withdrawn from the neck of the pivotal pin by engaging the hole $H^4$ with a suitable hooked instrument. The locking-plate is made of elastic steel, which enables it to bend sufficiently to allow it to be withdrawn, as described, and to again resume its normal shape when replaced in position in the side link.

I am aware that drive-chains have heretofore been constructed having center links arranged in pairs connected by a hollow barrel provided with friction-rolls and connected by side links which are united at their opposite ends by pivotal pins, and I do not claim such a construction broadly.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a drive-chain, the combination with center links adapted to engage the teeth of a sprocket-wheel, of a pair of side links capable of longitudinal movement, a pivotal pin permanently attached to each side link on opposite ends, means for engaging and disengaging the free ends of said pins in the side links by the separation and approach of links on the same side of the chain, and means for preventing said approach when the chain is in use.

2. In a drive-chain, the combination with center links adapted to engage a sprocket-wheel, of a pair of side links capable of longitudinal movement, a pivotal pin permanently attached to each side link on opposite ends, the free ends of said pins having necks adapted, after said pins have entered holes in said side links, to be drawn by the separation of the side links into slots communicating with said holes, and means for preventing the approach of the links on the same side of the chain and the consequent return of said pins into said holes when the chain is in use.

3. In a drive-chain, the combination with center links adapted to engage the teeth of a sprocket-wheel, of a pair of side links capable of longitudinal movement, a pivotal pin permanently attached to each side link on opposite ends, means for engaging and disengaging the free ends of said pins in said side link by the separation and approach of links on the same side of the chain and a locking-plate, whereby said links are held from such approach.

4. In a drive-chain, the combination with center links adapted to engage a sprocket-wheel, of a pair of side links capable of longitudinal movement, a pivotal pin permanently attached to each side link on opposite ends, the free ends of said pins having necks adapted, after the pins have entered holes in said side links, to be drawn by the separation of the side links into slots communicating with said holes, and a locking-plate whereby the links on the same side of the chain are held from longitudinal movement toward each other.

5. In a drive-chain, the combination with center links, of a pair of side links provided at both ends with holes and communicating slots, pivotal pins connecting the ends of said side links, said pins having flattened necks entering said holes and drawn into said slots by separation of the adjacent side links, and a locking-plate having a forked end to inclose said neck, and an inwardly-turned prong engaging the wall of the opening in the side link, whereby the relative movement of pivotal pins and side links is prevented.

6. In a drive-chain, the combination with center links adapted to engage a sprocket-wheel, of a pair of side links capable of longitudinal movement, a pivotal pin permanently attached to each side link on opposite ends, the free ends of said pins having necks adapted, after said pins have entered holes in said side links, to be drawn into slots communicating with said holes, and locking-plates having forked ends to inclose said neck and inwardly-turned prongs to engage the walls of said holes in said side links, whereby the relative movement of said pivotal pins and said side links is prevented.

Dated this 12th day of May, 1903.

WILLIAM H. GATES.

Witnesses:
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