(No Model.) 3 Sheets—Sheet 1.

C. B. HOLMES.

GEAR CASE FOR SPROCKET AND CHAIN DRIVES.

No. 592,288. Patented Oct. 26, 1897.

Fig. 1.

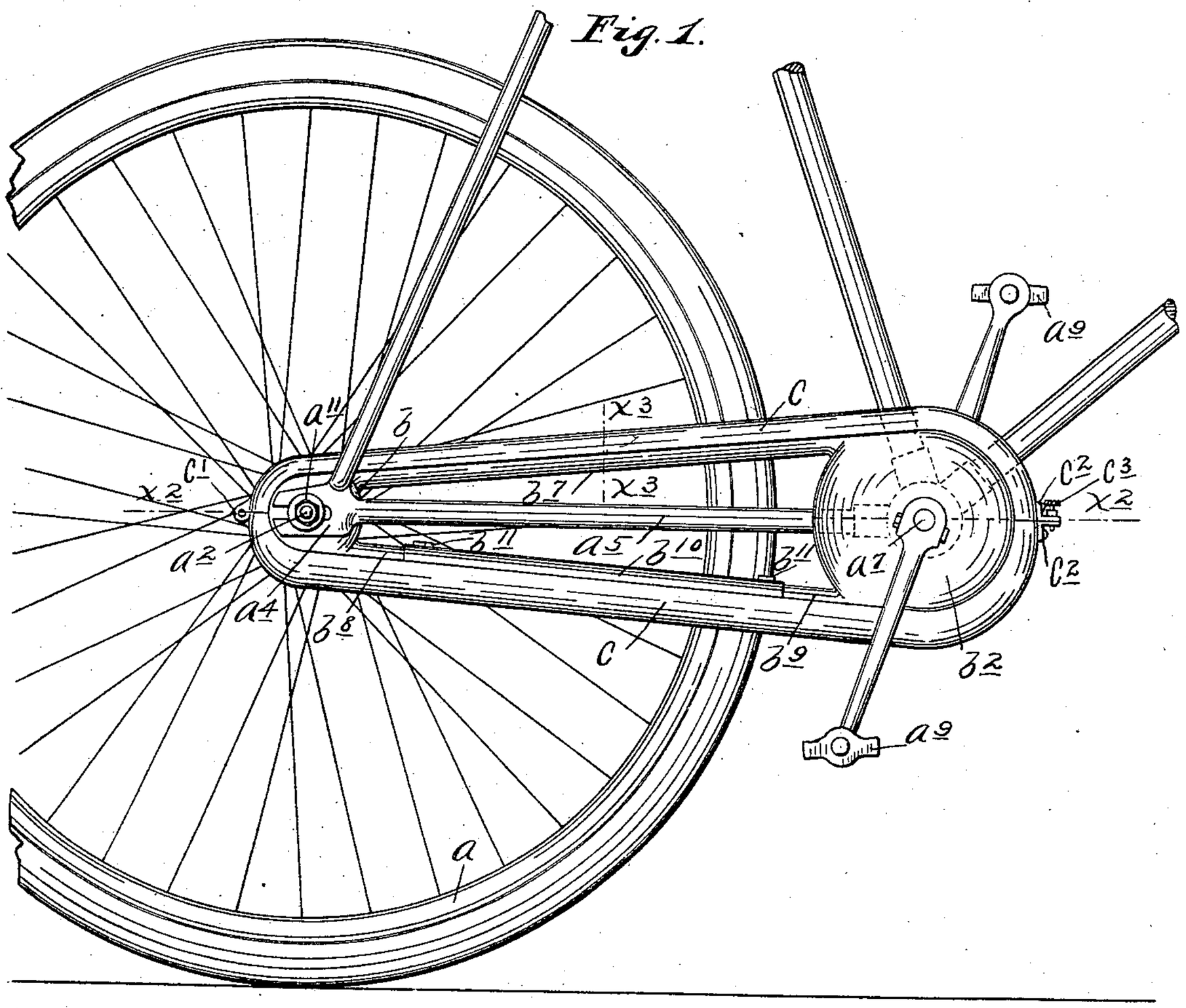

Fig. 2.

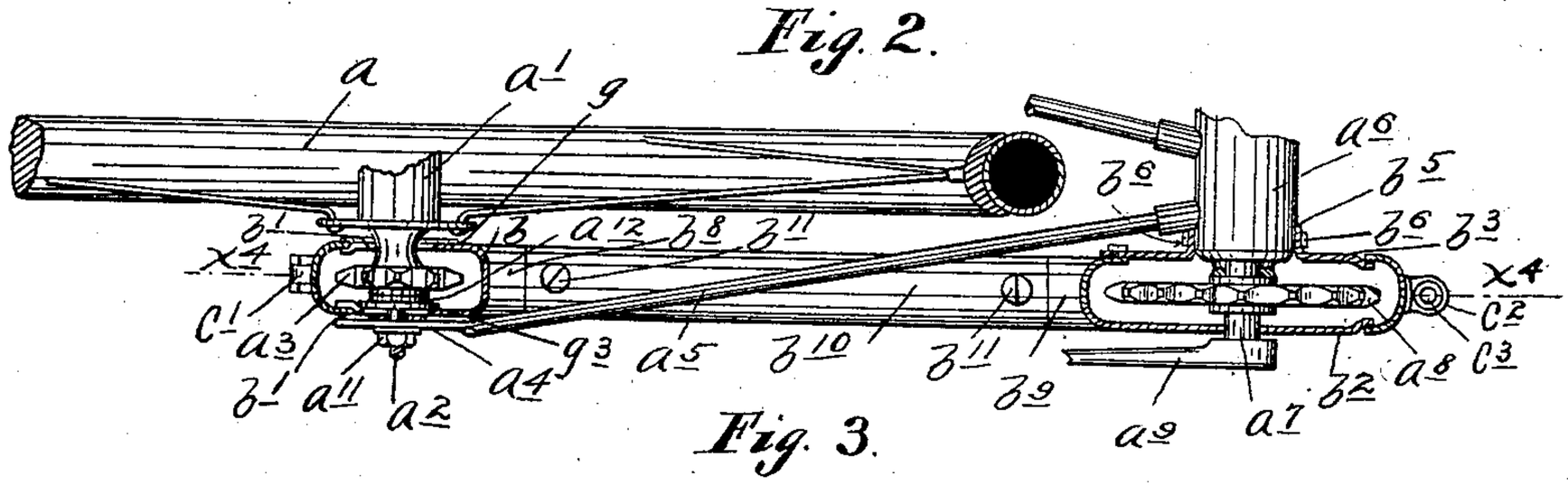

Fig. 3.

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Fig. 4.

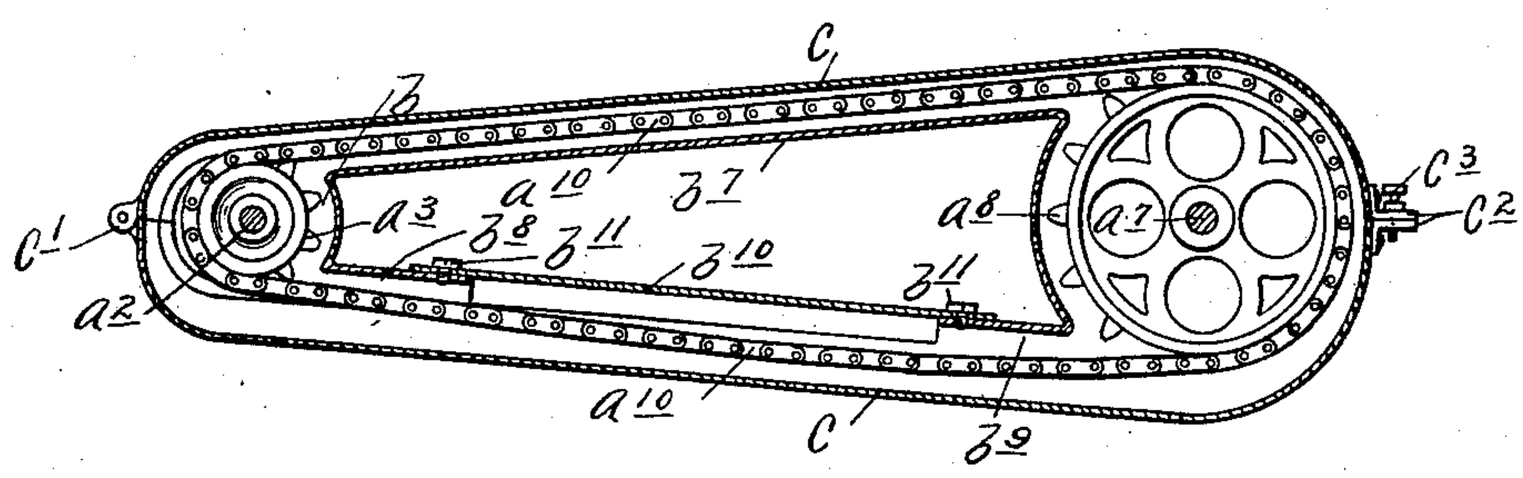


Fig. 6.

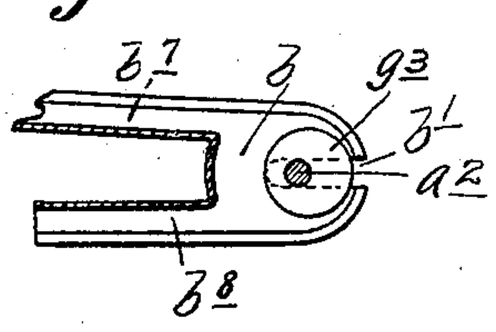
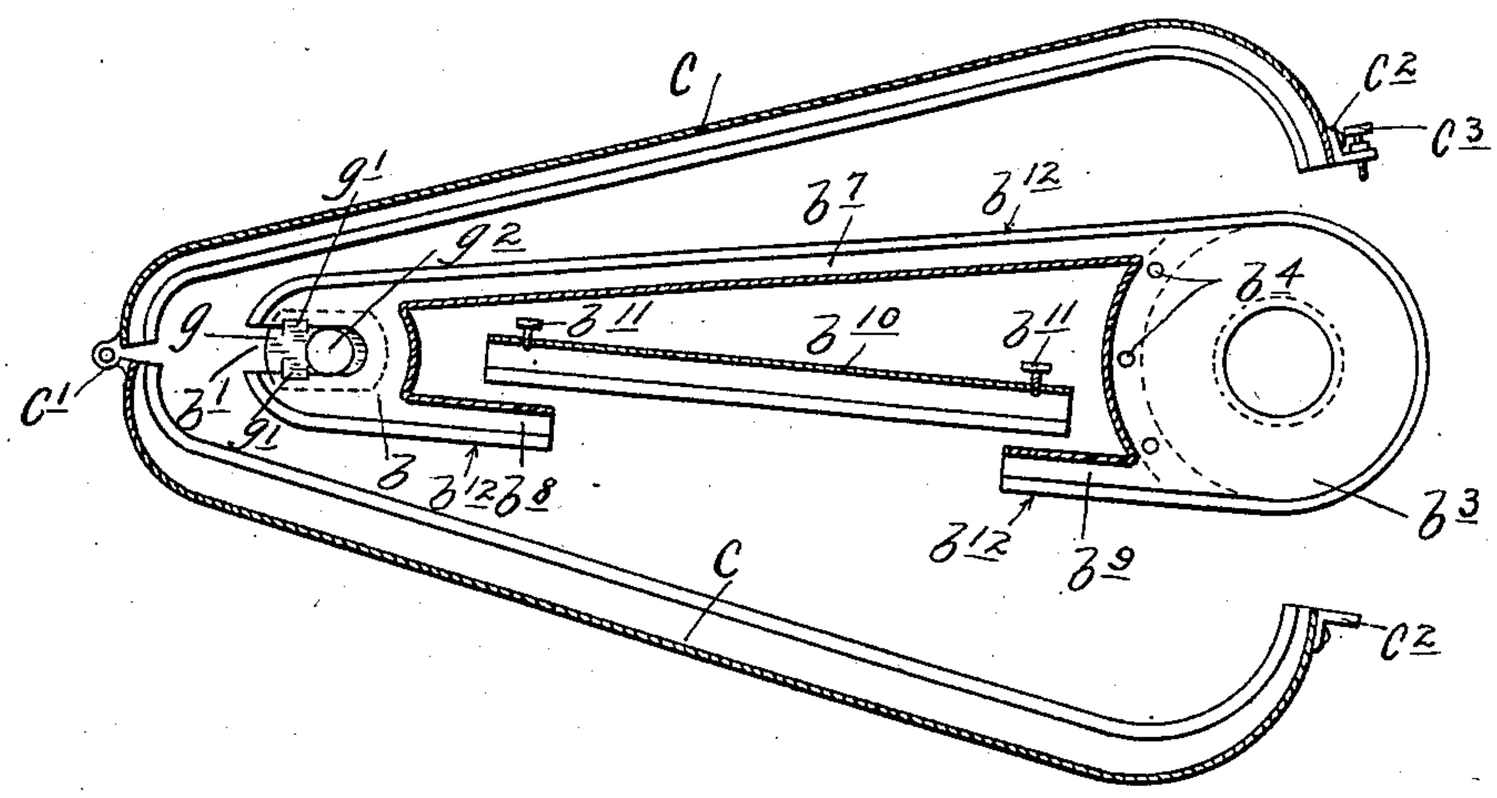


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 7.

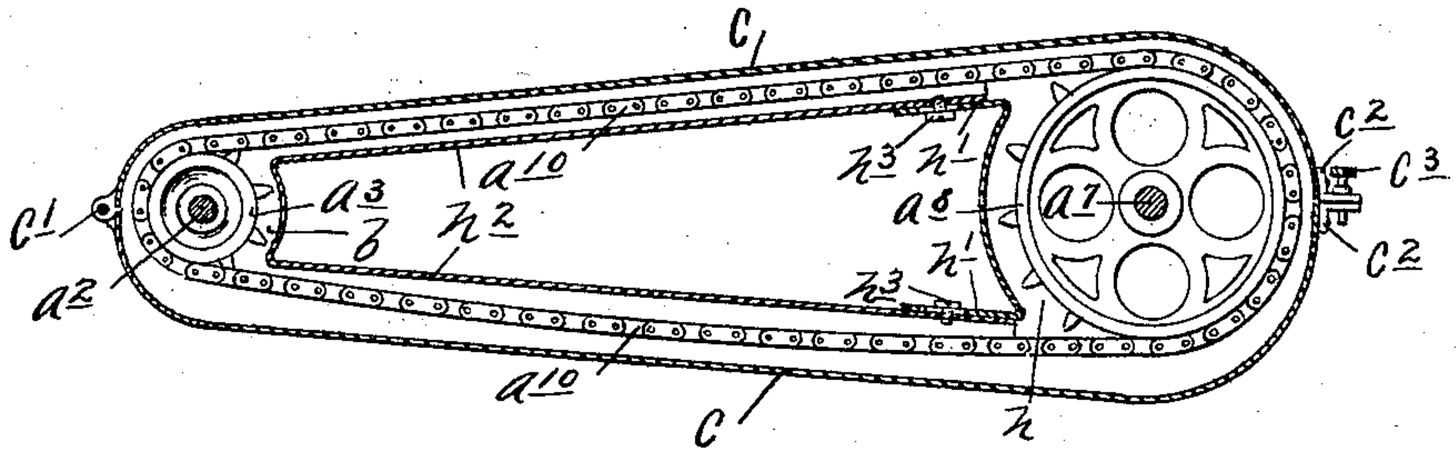
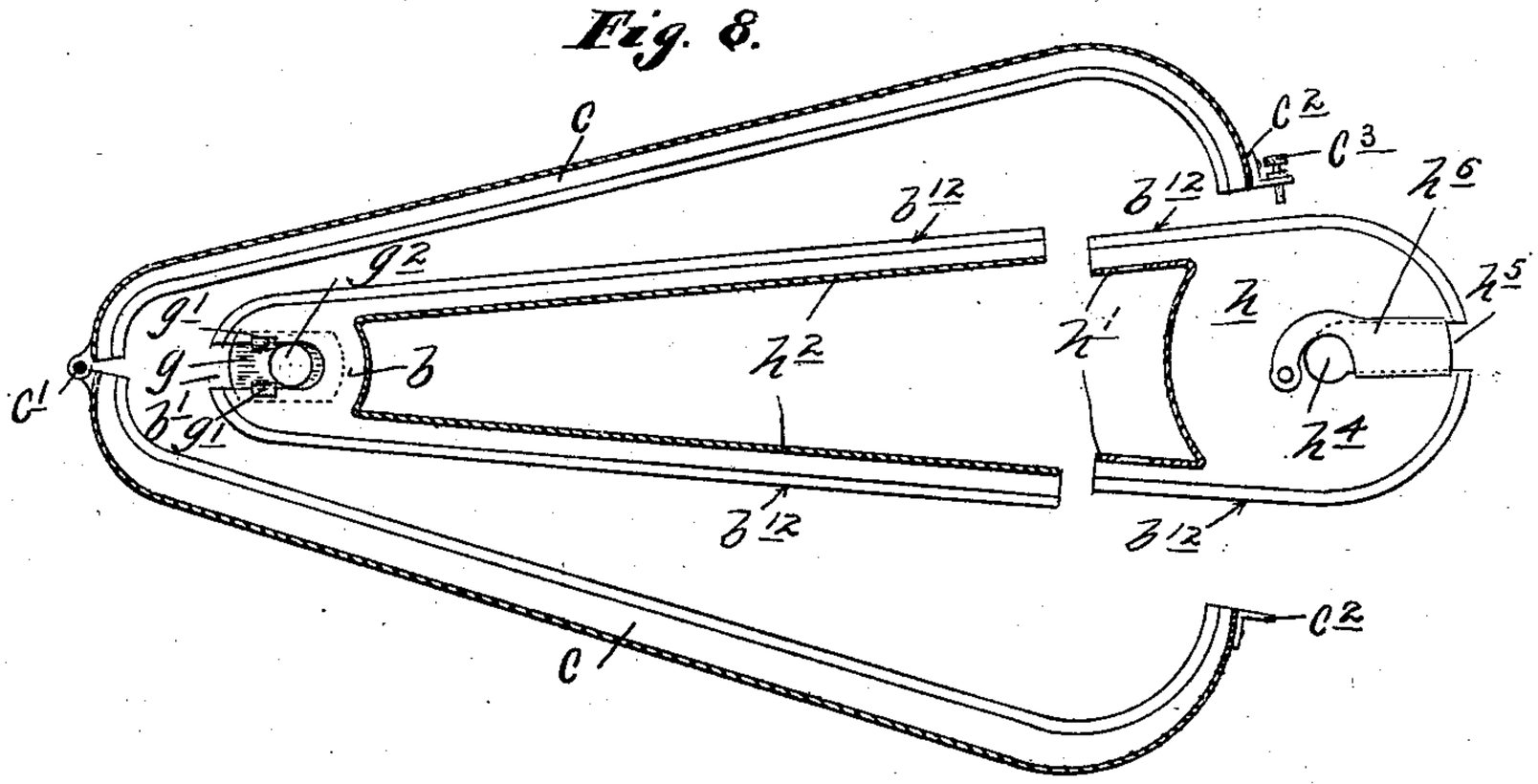


Fig. 8.



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Inventor:
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UNITED STATES PATENT OFFICE.

CHARLES B. HOLMES, OF MINNEAPOLIS, MINNESOTA.

GEAR-CASE FOR SPROCKET-AND-CHAIN DRIVES.

SPECIFICATION forming part of Letters Patent No. 592,288, dated October 26, 1897.

Application filed November 27, 1896. Serial No. 613,543. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. HOLMES, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Gear-Cases for Sprocket-and-Chain Drives; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an improved gear-case for sprocket-and-chain drives especially adapted for use on safety-bicycles.

To this end my invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

My invention is illustrated in the accompanying drawings, wherein, like letters referring to like parts throughout the several views—

Figure 1 is a view in right side elevation showing a portion of a safety-bicycle with my improved gear-case applied in working position to the sprocket-and-chain drive thereof. Fig. 2 is a horizontal section taken substantially on the line x^2 x^2 of Fig. 1. Fig. 3 is a transverse vertical section taken substantially on the line x^3 x^3 of Fig. 1, but with the driving-chain removed. Fig. 4 is a vertical longitudinal section taken substantially on the line x^4 x^4 of Fig. 2. Fig. 5 is a view corresponding in the line of its section to Fig. 4, but showing the parts of the case removed from the machine and drawn apart or separated from each other. Fig. 6 is a detail view, in longitudinal vertical section, showing a portion of the rear hood and case sections connected thereto, some parts being broken away, and the said parts being viewed from the left side of the machine. Fig. 7 is a view corresponding to Fig. 5, but illustrating a slightly-modified form of certain parts of the gear-case; and Fig. 8 is a view corresponding in the line of its section to Fig. 7, but showing the parts of the case removed from the machine and drawn apart or separated from each other.

Referring to the parts of the bicycle shown, a indicates the rear wheel, having the hub a' mounted on the spindle a^2 and provided with a small driven sprocket a^3. a^4 a^5 a^6 indicate, respectively, the rear forked ends, the bottom stays, and the crank-shaft hanger of the framework. a^7 indicates the pedal crank-shaft mounted, in said hanger a^6 and provided with a driving-sprocket a^8 and pedals a^9; and a^{10} indicates the sprocket-chain running over the sprockets a^3 and a^8, all of which parts may be of the ordinary standard construction.

Referring to the parts of my improved gear-case and directing attention first to my preferred form illustrated in Figs. 1 to 6, inclusive, it will be noted that when my improved gear-case is applied in working position on the machine, as shown in Fig. 1, both of the sprockets and the sprocket-chain are completely incased, so that it is practically impossible for any dust or dirt to find their way into the interior of the case. In this preferred form b indicates what I may term a "hood" for the rear sprocket a^3. This hood b in horizontal cross-section is U-shaped, so as to embrace the front and sides of said sprocket, and the sides of the same are formed with open-ended slots b', which pass and embrace the wheel-spindle a^2 and permit the proper adjustment of the same to take up the slack of the chain, as will later more fully appear.

b^2 b^3 indicate a somewhat similar but larger hood-section, which is adapted to embrace the sides and cover the rear portion of the driving-sprocket a^8. The inner prong or side b^3 of this hood b^2 b^3 is removable from the other section of said hood, being held in place therewith by means of small machine-screws b^4 or otherwise. The outer prong of said hood b^3 is provided with a central passage adapted to pass the pedal crank-shaft a^7, and the removable inner side section b^3 is provided with a central passage formed by a projecting annular flange b^5, adapted to embrace the right-side end of the crank-shaft hanger a^6 and to be firmly secured thereto by means of small machine-screws b^6.

As shown, the hood-sections b and b^3 are rig-

idly connected together by a channel-shaped piece b^7, which forms a cover or incasing section to the under side of the upper section of the chain. Likewise the lower portions of said hood-sections b and b^3 may be rigidly connected by means of stub channel-sections b^8 and b^9, projecting, respectively, from said hood-sections, and a removable channel-piece b^{10}, securable to said stub-channels b^8 b^9, as shown, by means of small machine-screws b^{11} This removable section b^{10}, when removed from the stub-sections b^8 b^9, will permit the case-sections so far described to be placed in working position, diagonally embracing the right member of the bottom stays a^5, as shown best in Fig. 2. To place these parts in working position, it is, however, necessary to remove the hood-section b^3 from the section b^2 and the right pedal arm or lever a^9 from the crank-shaft a^7. The first time the gear-case is placed in working position on the machine it is also necessary to remove the driving-sprocket a^8 from working position, so that the hood-section b^8 may be secured on the crank-shaft hanger a^6, as shown; but after the said section b^3 has once been placed in working position it will not again be necessary to remove the same either in removing the other parts of the case or in placing the same in working position, as it is only necessary to remove the screws b^4, thus separating said case-sections b^2 and b^3. It will also be noted that the hood-section b^3, when secured in working position, serves as a support for the entire front end of the gear-case.

To form a cover or marginal incasing case-section for the hood and inside chain-covers or incasing sections, I employ in my preferred form channel-sections c, which are bent at their ends to conform to the outer margins of the hood-sections and are secured together at their rear ends by a hinged joint c'. At their forward ends said sections c are adapted to be secured together by means of a clamping device involving bracket-irons c^2, secured thereto, and a thumb-screw c^3, working through one of said brackets and having screw-threaded engagement with the other, so as to draw the forward ends of said section c tightly together and onto the case-sections, with which they engage when placed in working position.

To form a dust-tight joint between the inside case-sections and what I have termed the "marginal cover" or "incasing section," the outer flanges or margins of the sections b, b^3, b^4, b^7, b^8, and b^9 are pressed abruptly inward to form continuous marginal shoulders b^{12}, and the inner marginal edges of the strips c are bent to form folds in which flexible packing-strips c^4 are securely held. When the parts are placed in working position, the flexible packing-strips c^4 will be tightly pressed against the coöperating marginal shoulders b^{12} of the said inside case-sections, thus, as is obvious, forming a tight joint therewith.

It is thought to be obvious from the foregoing description that the marginal cover or section c c may be readily placed in working position and removed. When the said marginal cover is removed, the chain may be readily taken off or placed in working position without removing any other portions of the gear-case. By further removing the section b^{10} such access may be had to the inside or running face of the chain as may be necessary to apply graphite to the same, for example.

It is also very important to note that in virtue of the construction shown and described the rear wheel may be adjusted toward and from the crank-shaft, so as to take up the slack of the chain without disturbing or readjusting the parts of the gear-case above described. To accomplish this, it is only necessary to loosen the nuts a^{11} on the ends of the rear-wheel spindle a^2.

I also preferably employ adjustable slot-closing devices, which serve to keep the slots b' of the rear hood-section b always closed regardless of the adjustment of the rear wheel. As shown, the inside slot b' is kept closed by means of a sliding plate g, held in working position and adjustably movable in said slot by means of keeper-lugs g' and provided with a perforation g^2, which is adapted to pass the hub of the sprocket-wheel a^3. The outside slot b' may likewise be also kept closed by means of an eccentric washer g^3 on the spindle a^2, which is adapted to be tightly clamped against the face of one of the ball-bearing cones and the inside of the outer prong of the rear hood b by means of the nut a^{11}. It will be seen that this clamping action on the outer prong of the hood b also serves to securely hold the rear end of the gear-case in working position.

The construction illustrated in Figs. 7 and 8 is substantially the same as that just described, with the following exceptions: The forward hood-section h is formed with a pair of stub channel-sections h', while the rear hood-section b is formed with a pair of long channel-sections h^2, the forward ends of which are detachably securable to the stub-sections h' by means of machine-screws h^3. The prongs or side plates of the hood h are provided with central shaft-passages h^4, from which slots h^5 are cut to the forward edges of said prongs. These slots h^5 may be closed by means of pivoted shields or cover h^6. With this latter-described construction it is possible to place the gear-case in working position, without removing either the right pedal a^9 or driving-sprocket a^8, simply by an endwise movement of the section h h', with the slots h^4 embracing the pedal crank-shaft, and then connecting the stub-sections h' to the sections h^2 after both of the said hoods have been placed in working position.

The efficiency of my improved gear-case is thought to be obvious from the foregoing description. It will be understood, of course, that various alterations in the details of con-

struction may be made without departing from the spirit of my invention. For example, if the marginal case-sections *c c* are made sufficiently flexible or spring-yielding they might be formed of a single strip and the hinged joint *c'* dispensed with, and the forward or sectioned ends of the same might be secured together by any suitable form of clamping device.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. A gear-case for a sprocket-and-chain drive, involving hood-sections with pronged disk-like sides that substantially cover the sides of the sprocket-wheels, channel-shaped inside case-sections, extending between said hoods, and a channel-shaped marginal cover for said hoods and inside case-sections, formed by two hinged sections that are detachably securable at their free ends, substantially as described.

2. A gear-case for a sprocket-and-chain drive, involving the hood *b* with slots *b'*, the hood-section b^2 with removable side b^3, the inside case-section b^7 uniting said hood-sections *b* and b^3, the stub-sections b^8 b^9, respectively, on said hood-sections *b* and b^3, the removable inside case-section b^{10} and the outside marginal case-sections embracing and closing the outer open margins of said aforenamed case-sections, substantially as described.

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

CHARLES B. HOLMES.

Witnesses:
C. F. KILGORE,
F. D. MERCHANT.