

No. 610,313.

Patented Sept. 6, 1898.

G. A. WATERS.
CHAIN GUARD.

(Application filed July 3, 1897.)

(No Model.)

2 Sheets—Sheet 2.

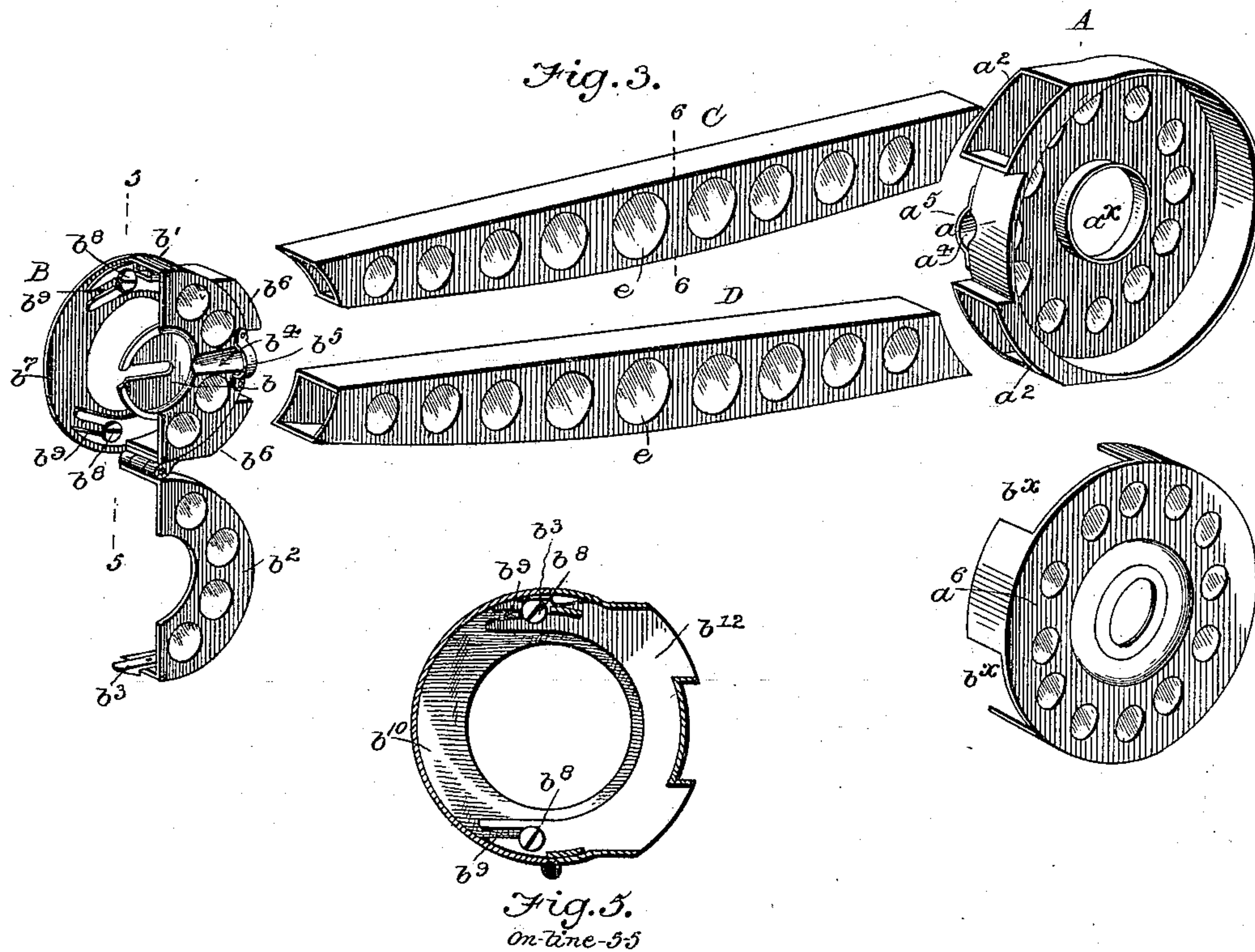


Fig. 7.
On-line 7-7

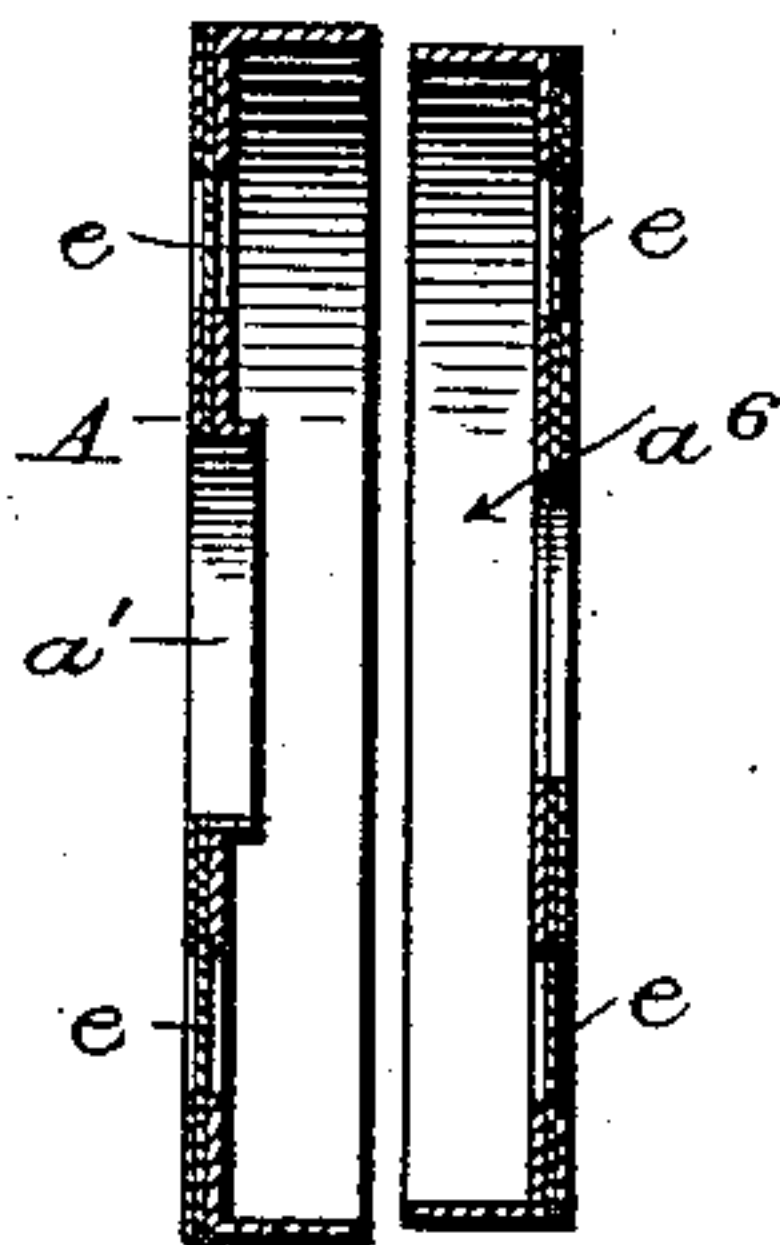


Fig. 6.
On-line 6-6

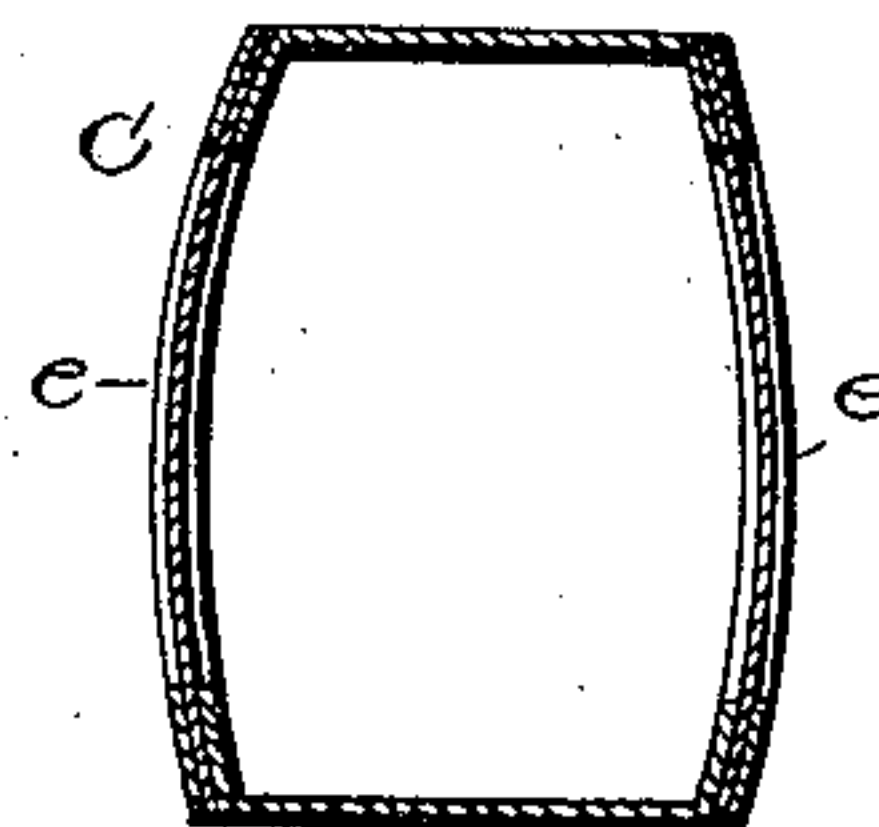
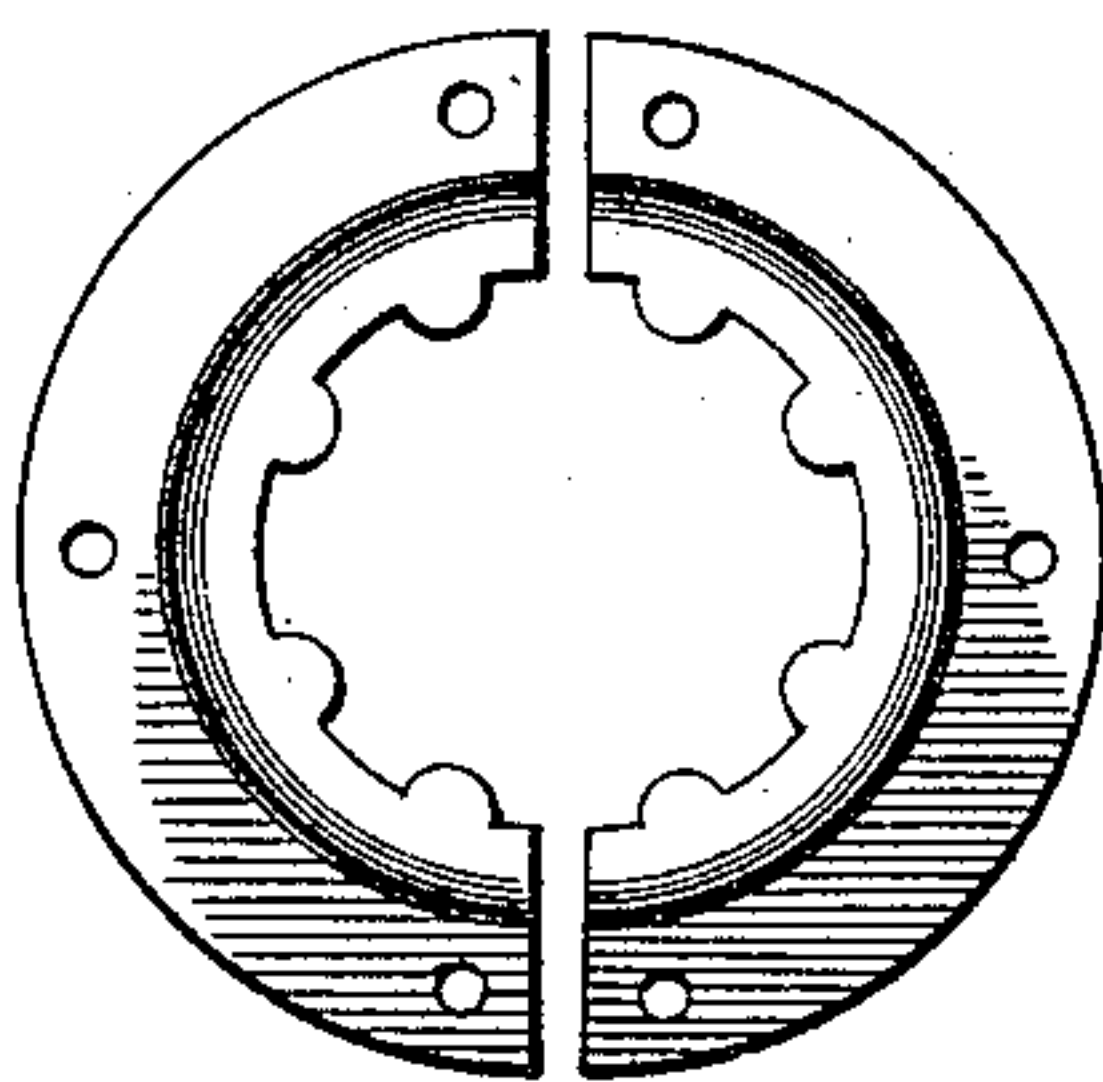


Fig. 8.



WITNESSES:

Arthur Ashley
J. S. Elmore

INVENTOR
G. A. Waters
BY
P. Y. Dodge
ATTORNEY.

UNITED STATES PATENT OFFICE.

GEORGE A. WATERS, OF TROY, NEW YORK.

CHAIN-GUARD.

SPECIFICATION forming part of Letters Patent No. 610,313, dated September 6, 1898.

Application filed July 3, 1897. Serial No. 643,370. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ARTHUR WATERS, of Troy, county of Rensselaer, and State of New York, have invented a new and useful Improvement in Bicycle-Guards, of which the following is a specification.

My invention relates to a casing for inclosing and protecting the sprocket-wheel and driving-chains of so-called "safety-bicycles."

The aim of my invention is to provide an exceedingly light and inexpensive case which may be quickly adjusted to any ordinary bicycle now in use, which will completely exclude dust from the wearing-surfaces and protect the clothing of the wearer from contact with the oil-surfaces, and which without being in itself adjustable will admit of the distance between the sprocket-wheels being varied to the extent necessary to regulate the tension of the driving-chain.

My guard comprises as essential elements an improved arrangement of two circular or substantially circular cases adapted to inclose the front and rear sprocket-wheels and two rigid tubes connecting such cases and inclosing the intermediate portion of the chain. The front and rear cases are adapted to be secured rigidly to the frame and each provided with upper and lower necks which serve to give support to two ends of the intermediate rigid tubes having their ends formed to fit removably but snugly within the necks and which are commonly made of paper or of similar material, so that they may be readily cut at their ends in order that their length may be readily controlled by cutting away their ends in order to adapt them to machines of different sizes or designs. The inner side of the rear case is formed mainly by a plate adjustable forward and backward with the sprocket-wheel, so that the adjustment of the wheel to regulate the tension of the chain may be effected without in any manner disturbing or adjusting the principal parts of my guard or casing. This feature, which permits the use of rigid longitudinal tubes and avoids the necessity of complicated provisions for elongating and shortening the guard, is a leading characteristic of my invention.

Figure 1 is a side elevation showing the rear portion of a bicycle with my guard applied thereto. Fig. 2 is a similar view with

the casings at the two ends opened in order to expose the sprocket-wheel. Fig. 3 is a perspective view showing the parts of my guard disconnected from each other and from the machine. Fig. 4 is a horizontal cross-section through the rear end of the guard as applied to the machine on the line 4 4 of Fig. 1. Fig. 5 is a vertical section through the rear end of the case on the line 5 5 of the preceding figure, illustrating particularly the movable inner plate at the rear end. Fig. 6 is a cross-section of one of the tubes on the line 6 6 of Figs. 1 and 3. Fig. 7 is a vertical cross-section through the casing for the forward sprocket-wheel on the line 7 7 of Fig. 1, the parts being separated from each other and from the machine. Fig. 8 is a perspective view showing a plate which may be used on the rear wheel.

Referring to Figs. 1, 2, and 3, A represents the casing for the forward sprocket-wheel, secured rigidly to the bicycle-frame; B, the casing for the rear sprocket-wheel, also secured rigidly to the bicycle-frame, and C and D the two rigid tubes, sustained at their ends by the above-mentioned casings and inclosing the intermediate portions of the chain.

The forward casing A consists of two sections, each consisting of a circular plate provided with a peripheral lateral flange and adapted to fit one within the other. The inner section a has a central opening a' , surrounded by an inwardly-extending flange a^x , which is adapted to fit snugly around the cylindrical shaft-hanger and give support to the casing at its center. This inner section is also provided with two horizontal projecting necks a^2 and a^3 , through which the chain extends and by which the ends of the tubes C and D inserted therein are sustained. The inner and larger section a is provided with a groove or depression a^4 to receive the horizontal bar of the bicycle-frame, to which the part is firmly secured by a strap or clasp a^5 , extending around the inner side of the frame-bar and screwed to the casing. Any equivalent form of fastening device which will secure the section rigidly to the frame of the bicycle may be employed. The outer section of the casing a^6 (shown detached in Fig. 3) is adapted to fit snugly within the other section in order to close its outer side tightly. It is

provided, however, with a central opening into which the hub of the sprocket-wheel extends and with an annular flange adapted to fit within the inner section *a*, and cut away, as at *b*^x, opposite the necks on the inner section. This arrangement insures the secure retention of the outer section in the inner section by the extended friction bearing-surfaces, formed by the flanges on said sections, the cut-away portions of the flange on the outer section admitting of the extension of the upper and lower tubes through the necks and well into the casing.

The casing B for the rear sprocket consists of a circular box-like body having an outer side *b* to cover the wheel and a peripheral flange *b*¹ to encircle the same. This case is divided vertically through the center, and the portion *b*² is hinged to the remaining portion, so that it may be swung backward in order to give access to the interior and expose the sprocket-wheel and chain. The hinged portion is provided with a swing-latch *b*³, by which it is secured in its closed position, as shown in Fig. 1. This rear casing is applied to the inside of the frame around the sprocket-wheel and is grooved at *b*⁴ to fit the same and secured rigidly thereto by a strap or clasp *b*⁵. This casing is provided with two tubular necks *b*⁶, similar to those on the forward case, to receive and sustain the ends of the tubes C and D. This rear casing has its inner or rear side formed by an annular plate *b*⁷, (clearly shown in Figs. 3, 4, and 5,) secured thereto by screws *b*⁸, extending through slots *b*⁹, formed in a semicircular flange *b*¹², secured to the peripheral flange *b*¹ and extending in a plane parallel with that of the outer side *b*. This arrangement admits of the inner plate being adjusted forward and backward in order that it may retain its relation to the rear wheel as the latter is adjusted to regulate the chain. It is to be noted that this adjustable rear plate permits the usual adjustment of the wheel without requiring any change or adjustment of the guard or casing. It admits of the casing being applied to and remaining rigidly on the machine. The essential feature of the invention in this regard lies in the use of a plate which closes the inner side of the wheel-casing and which is adjustable forward and backward with the wheel in relation to the principal parts of the casing, so that the latter may remain undisturbed.

In order to the more effectually exclude dust from the casing, I provide the inner closing-plate *b*⁷ with a lining of cloth or felt *b*¹⁰, which encircles its central opening and extends some distance inward beyond the edge of said opening. If the hub of the wheel is of such shape that this felt lining can fit snugly against the same, it will be quite sufficient for the purpose. If, however, the hub of the wheel is not of a shape and size adapted to close the central opening and fit snugly against the felt lining, I attach to the rear drive-wheel adjacent to the annular plate *b*⁷ an annular plate

E, such as shown in Fig. 8. This may be clipped to the spokes of the wheel or otherwise attached thereto, and it is adapted to completely close the central opening of the casing and fit snugly against the felt lining so that no dust may enter between them, as more particularly shown in Fig. 4.

The long tubes C and D are simply thrust at their ends tightly into the necks on the gear-cases and are sustained firmly in place thereby. These tubes are preferably made, as shown, with a downward groove from their ends toward the middle in order that the sagging chain may pass through them without contact. In cross-section they are approximately rectangular, but are preferably rounded on the vertical sides and made slightly wider at the bottom than at the top, as clearly shown in Fig. 6, and this for the purpose of increasing their strength, giving them a more graceful appearance, and allowing the chain to vibrate without touching them. My guard may be constructed of any suitable material. I prefer, however, on account of its lightness to employ aluminium for the casings and to build up the long tubes of paper laminæ.

In order to reduce the weight and give a lighter and more ornamental appearance and to permit inspection of the chain and wheels without opening the case, I propose to provide the casings and the tubes, or either of them, with windows *e*. These windows may be of circular or of any other approved form and may be closed by celluloid, mica, glass, or any other transparent material. I prefer, however, to employ celluloid and to secure the same in place, as shown in Fig. 6, by laying the material over the opening and thereafter cementing a sheet of paper or similar material over and around the outer edges, which latter are thus confined and protected between the inner and the outer sheets.

While I prefer to construct the rear wheel-casing of two sections hinged together, it is understood that the rear section may be attached in any other suitable manner which will admit of its being readily removed to give access to the interior. It is also to be understood that the plate *b*⁷ may be connected to the rear casing by any means the mechanical equivalent of the slots and screws, the only requirement being that the plate shall be adjustable forward and backward with the wheel. It is of course advised that where the rear wheel is not adjustable or where for any other reason the adjustment of the plate *b*⁷ is unnecessary it may be fixed rigidly in position.

Having thus described my invention, what I claim is—

1. In a bicycle-guard a front casing adapted to inclose the front gear and comprising an inner section having an annular flange and two necks opening therethrough, and an outer section comprising a plate to close the outer side of the inner section, and provided with an annular flange to fit within the inner sec-

tion and cut away at points opposite the necks; whereby the outer section will be held securely to the inner section by friction, the cut-away portions of the flange permitting of the extension of the chain-inclosing tubes within the casing.

2. In a bicycle-guard the rear gear-casing formed with a hinged section and an adjustable plate *b'* applied to the inner side of said casing.

3. In a bicycle-guard the rear gear-casing consisting of the annular flanged body adapted to inclose the periphery of the gear and its outer side, a plate forming the inner side of said casing, and devices for securing said plate adjustably to the body portion of the casing.

4. In a bicycle-guard the rear gear-casing consisting of an outer plate to cover the outer side of the gear, a connected annular flange to inclose its periphery, a semicircular flange extending in a plane parallel to the outer plate and connected to the annular flange, and an annular plate *b'* adjustably secured to the semicircular flange.

5. In combination with a bicycle, a rear gear-casing having its main portion fixed rigidly to the frame, the inner plate *b'* adjustable forward and backward on the main portion and having a central opening, the lining of packing or equivalent material applied to the plate *b'* around the opening therein, and

the plate *E*, fixed to the bicycle-wheel adjacent to the casing and coöperating with the packing, on the plate *b'*.

6. In combination with a bicycle, a rear gear-casing inclosing the rear gear and having an inner plate formed with an opening and a lining of packing or equivalent material applied to said plate and surrounding the opening, and a plate *E* fixed to the rear wheel of the machine adjacent to the inner plate of the casing and adapted to coöperate with the lining and close up the space within the lining; whereby the access of dust is effectually prevented to the interior of the casing.

7. As a new article of manufacture a chain-inclosing tube for bicycle-guards formed of laminated material fashioned in the form of a tube and provided at intervals in its sides with openings, and a transparent material applied over said openings with its edges extended and confined between the laminae; whereby a light structure is produced and the inclosed chain exposed through the openings throughout its length.

In testimony whereof I hereunto set my hand, this 15th day of June, 1897, in the presence of two attesting witnesses.

GEORGE A. WATERS.

Witnesses:

E. W. CAPRON,
ELISHA WATERS.