

(No Model.)

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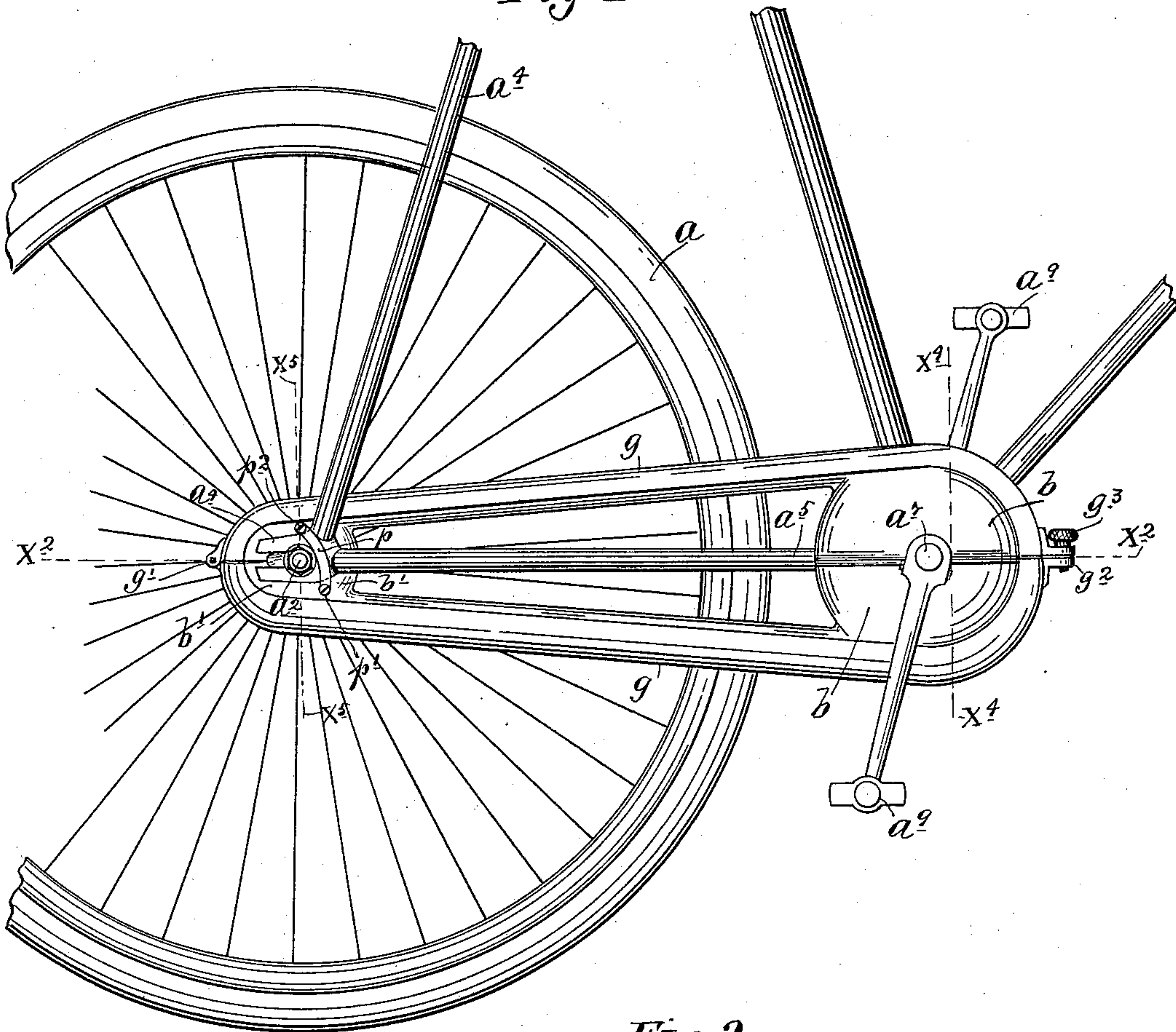
C. B. HOLMES.

GEAR CASE FOR SPROCKET AND CHAIN DRIVES.

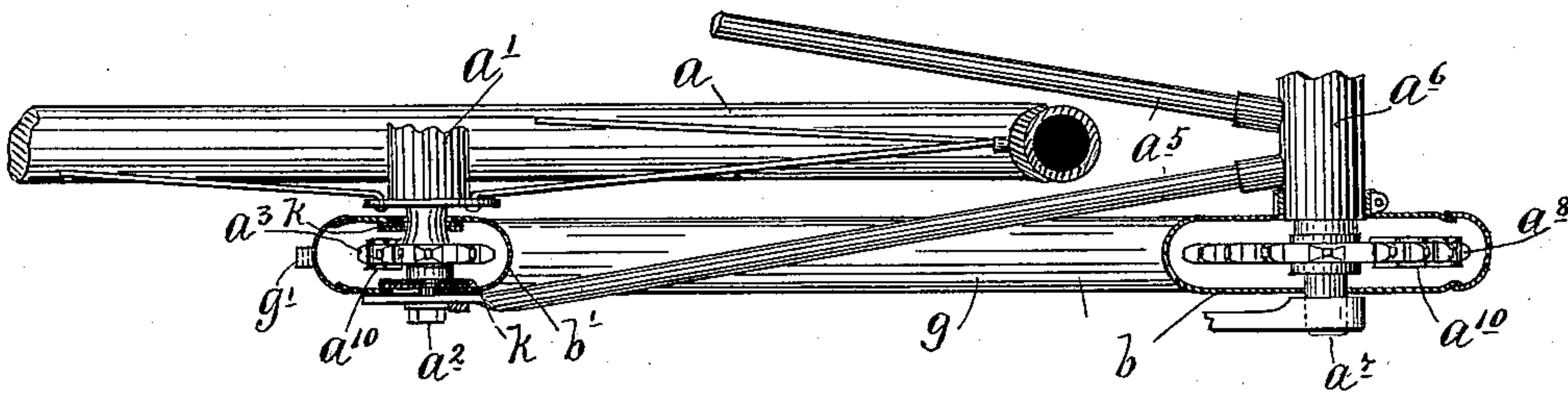
No. 592,289.

Patented Oct. 26, 1897.

*Fig. 1.*



*Fig 2.*



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By his Attorney.  
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(No Model.)

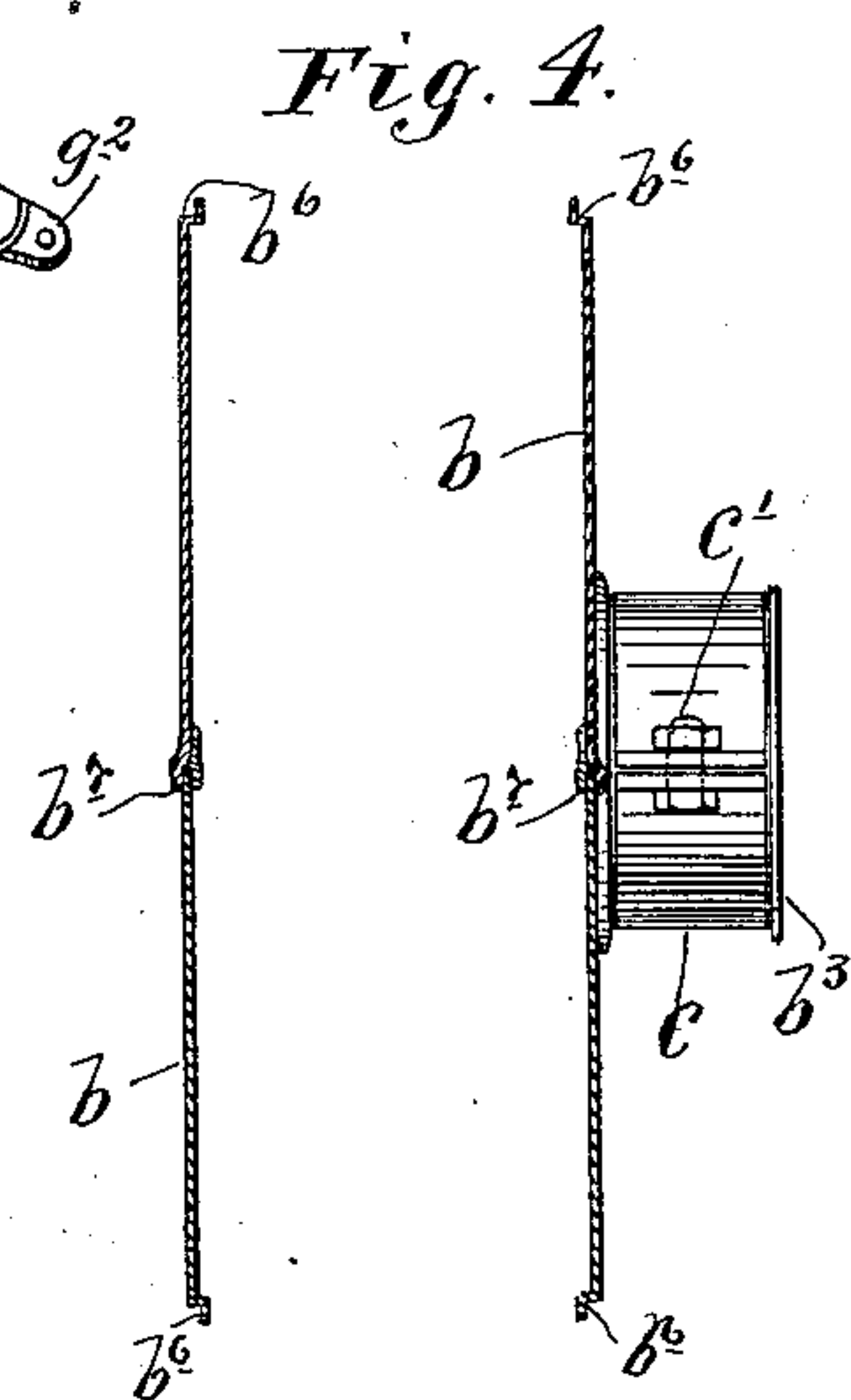
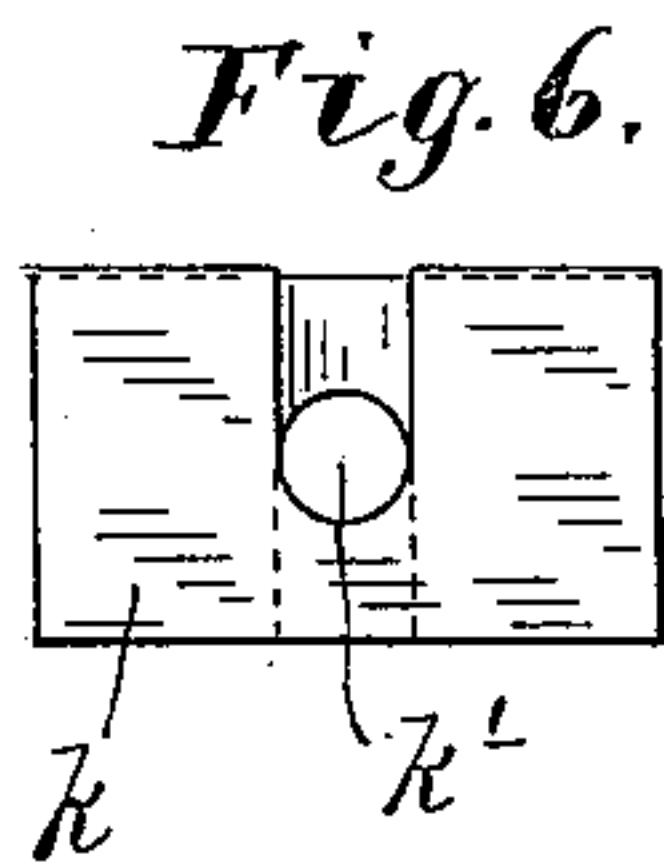
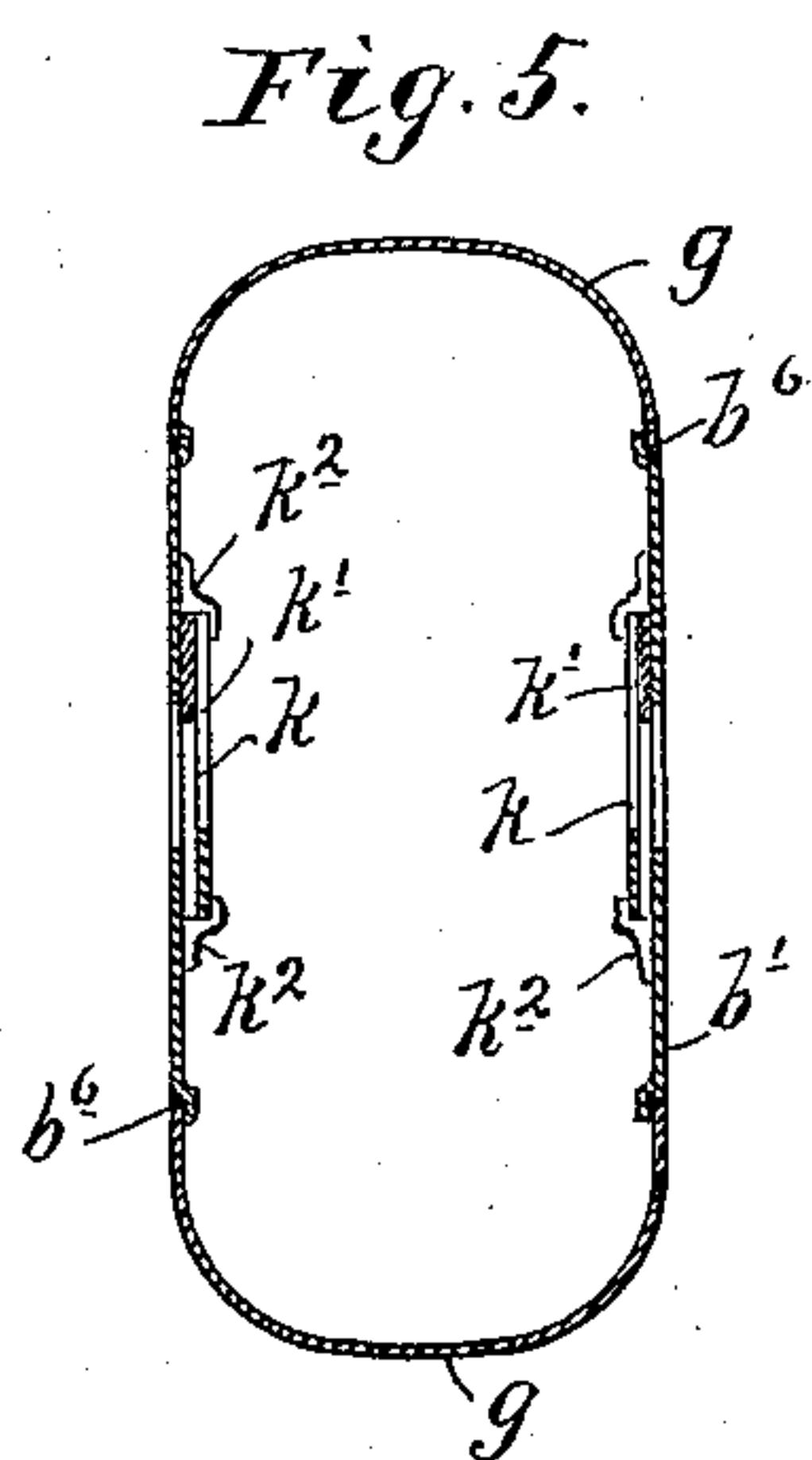
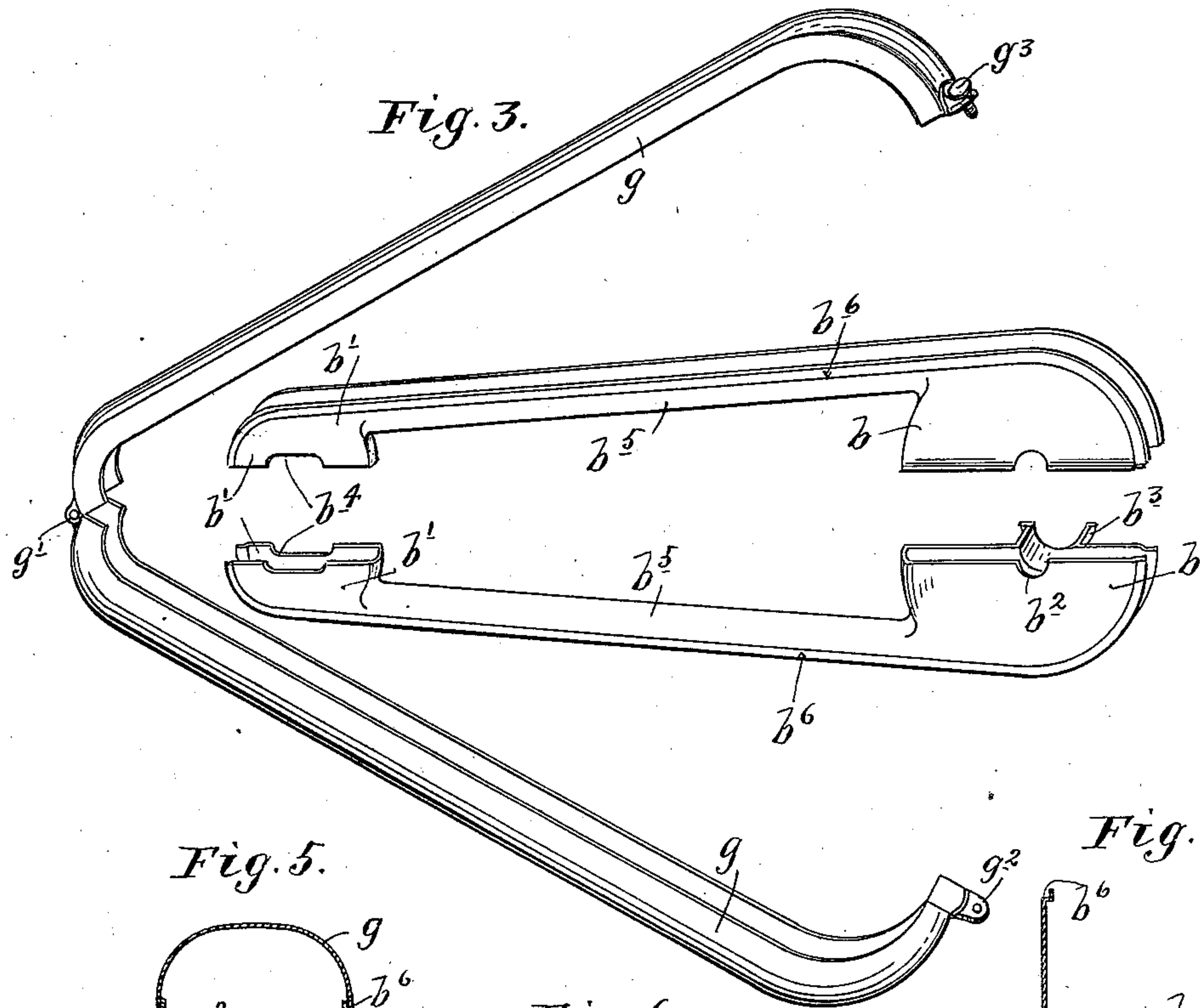
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# UNITED STATES PATENT OFFICE.

CHARLES B. HOLMES, OF MINNEAPOLIS, MINNESOTA.

## GEAR-CASE FOR SPROCKET-AND-CHAIN DRIVES.

SPECIFICATION forming part of Letters Patent No. 592,289, dated October 26, 1897.

Application filed May 10, 1897. Serial No. 635,815. (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 bicycles, and is in the nature of an improvement on the device disclosed in my pending application, Serial No. 613,543, filed November 22, 1896, entitled "Gear-case for sprocket-and-chain drives."

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

The preferred form of my present 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 on the sprocket-and-chain drive thereof. Fig. 2 is a horizontal section taken substantially on the line X<sup>2</sup> X<sup>2</sup> of Fig. 1. Fig. 3 is a perspective view showing the parts of a gear-case removed from the machine and opened up or separated. Fig. 4 is a vertical section taken through the gear-case substantially on the line X<sup>4</sup> X<sup>4</sup> of Fig. 1, the parts of the sprocket-and-chain drive not being shown. Fig. 5 is a vertical transverse section taken through the gear-case on the line X<sup>5</sup> X<sup>5</sup> of Fig. 1, the parts of the sprocket-and-chain drive not being shown; and Fig. 6 is a side elevation showing the sections of one of the slot-closing devices removed from working position.

Of the parts of the bicycle shown, *a* indicates the rear wheel, having the hub *a'* mounted on the rear spindle *a<sup>2</sup>* and provided with the small driven sprocket *a<sup>3</sup>*.

*a<sup>4</sup>* *a<sup>5</sup>* *a<sup>6</sup>* indicate, respectively, the rear forked ends, the bottom stays, and the crank-shaft hanger of the framework.

*a<sup>7</sup>* indicates the pedal-crank shaft, mounted in said hanger *a<sup>6</sup>* and provided with a driving-sprocket *a<sup>8</sup>* and pedals *a<sup>9</sup>*, and *a<sup>10</sup>* indicates the sprocket-chain, which runs over the sprockets *a<sup>3</sup>* and *a<sup>8</sup>*, all of which parts may be of the ordinary or standard construction.

Directing attention particularly to Fig. 1, it will be noted that when my improved gear-case is applied in working position both of the sprockets and the sprocket-chain are completely incased, so that it is practically impossible for dust or dirt to find their way into the interior of the case.

*b b'* indicate what I term "hood-sections," which in longitudinal cross-section are substantially U-shaped and in side elevation are substantially semicircular. Two of the sections *b*, when placed in working position, form disk-like sides which embrace and substantially cover the sides of the sprocket-wheel or driving-sprocket *a<sup>8</sup>*, and likewise two of the hood-sections *b'*, when placed in working position, form disk-like sides which embrace and substantially cover the sides of the rear or driven sprocket *a<sup>3</sup>*, which is carried with the rear wheel *a*. The hood-sections *b* are provided with centrally-located semicircular perforations or half-seats *b<sup>2</sup>*, which are adapted to register and form passages for the pedal-crank shaft *a<sup>7</sup>*. The inside half-seats *b<sup>2</sup>* are formed with inwardly-extending half-collars *b<sup>3</sup>*, which are adapted to embrace the right end of the crank-shaft hanger *a<sup>6</sup>*. The half-collars *b<sup>3</sup>* are adapted to completely embrace the said crank-shaft hanger *a<sup>6</sup>* and are firmly held in working position by means of a split clamp *c*, the split ends of which are drawn together by means of a screw *c'* or otherwise. The hood-sections *b'* are provided with centrally-located elongated half-seats *b<sup>4</sup>*, which, when said sections *b'* are placed in working position, register with each other and form passages for the rear spindle *a<sup>2</sup>* and permit a limited longitudinal adjustment of said spindle and parts mounted thereon, as is necessary to take up the slack of the sprocket-chain *a<sup>10</sup>*. A pair of channel-shaped



inside chain-sections  $b^5$  rigidly connect the upper member of the hood-sections  $b$  with the upper member of the hood-sections  $b'$  and the lower member of said hood-sections  $b$  with the lower member of said hood-sections  $b'$ . These inside case-sections  $b^5$  cover the running or inside face of the chain and more or less of the sides of the same. The outer flanges or margins of the inside chain-sections  $b^5$  and the hood-sections  $b$  and  $b'$  are shouldered or crimped, as indicated at  $b^6$ .

To form a marginal cover or incasing sections for the hoods and inside case-sections, I employ in my preferred form channel-sections  $g$ , which are bent at their ends to conform to the outer marginal shoulders  $b^6$  of the hoods and inside case-sections, and are secured together at their rear ends by a hinged joint  $g'$ . At their forward or free ends the marginal case-sections  $g$  are adapted to be secured together by means of a clamping device involving bracket-irons  $g^2$ , secured thereto, and a thumb-screw  $g^3$ , working through one of said bracket-irons and having screw-threaded engagement with the other. By means of this or other suitable clamping device the sections of the marginal cover  $g$  are adapted to be firmly drawn and secured together and clamped onto the shoulders  $b^6$  of the hoods and inside chain-covers  $b$ ,  $b'$ , and  $b^5$ . If desired, one member of each of the hood-sections  $b$  and  $b'$  may be provided on its longitudinal split edge or center with a pronged or V-shaped edge which is adapted to receive the sharp edge of the connected hood-sections, as shown at  $b^7$  in Fig. 4. To prevent confusion, no attempt has been made to show this joint  $b^7$  on Fig. 3 of the drawings. I also preferably employ an adjustable slot-closing device which serves to keep the slots  $b^4$  in the hood  $b'$  always closed, regardless of the adjustment of the rear wheel. This I accomplish by means of overlapping plates  $k$ , which are provided with reversely-extending slots  $k'$  and are adapted to slide in suitable guideways formed between keeper-lugs  $k^2$ , secured on the insides of the prongs of the hood-sections  $b'$ . The overlapping plates  $k$  are adapted to be placed with their slots  $k'$  straddle of the rear spindle  $a^2$  in reverse directions, so as to closely fit in the one case the spindle  $a^2$  and in the other case the hub of the sprocket-wheel  $a^3$ . The overlapped plates  $k$  follow the rear wheel and spindle in their adjustments and always keep the slots or seat  $b^4$  closed, so that dust cannot enter therethrough.

The great improvement in my present form of gear-case over the form disclosed in my prior application, and more particularly over the older forms, is found in the extreme ease with which the case may be applied in working position on the machine or bicycle, it being possible to apply the case to the machine and remove it therefrom without disturbing or removing any part of the machine except

the chain of the sprocket-and-chain drive. To accomplish this, the inside sections of the case (involving each an inside case-section  $b^5$ , a hood-section  $b$ , and a hood-section  $b'$ ) are placed in working position over the sprockets, one by downward and the other by upward movement, and are secured as described, and after this has been done the sectional marginal cover  $g$  may be placed in working position in a manner already described.

To still further secure the rear end of the gear-case to the machine-frame, I also preferably employ a small link  $p$ , which is pivoted to the outer prong of one of the hood-sections  $b'$ , as shown at  $p'$ , and is adapted to be secured to the outer prong of the other hood-section  $b'$  by means of a screw  $p^2$ . This link  $p$ , when applied as shown in Fig. 1, tightly clamps the rear hood  $p'$  to the rear fork prong of the cycle-frame.

It will be understood, of course, that various alterations in the details of construction above set forth may be made without departing from the spirit of my invention. For instance, while in all cases it would be necessary that at least one of the hoods be split axially the other of said hoods might be otherwise split.

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 pronged and sectioned or two-part hoods, at least one of which hoods is divided or split on the line of a plane cutting its axial center in the general direction of the length of the gear-case, channel-shaped inside case-sections uniting the sections of the different hoods, and a channel-shaped marginal cover for said hoods and inside case-sections, adapted to embrace and clamp said parts together, substantially as described.

2. A gear-case for a sprocket-and-chain drive, involving pronged hoods which are split or divided on the line of a plane cutting the axes of both of said hoods, or substantially cutting the same, channel-shaped inside case-sections uniting the sections of the different hoods, and a channel-shaped marginal cover for said hoods and inside case-sections, adapted to embrace and clamp said parts together, substantially as described.

3. A gear-case for a sprocket-and-chain drive, involving the supplemental hood-sections  $b$ , provided with the half-seats  $b^2$ , the supplemental hood-sections  $b'$  with elongated half-seats  $b^4$ , the inside case-sections  $b^5$  uniting said hood-sections  $b$  and  $b'$  in pairs, and the two-part marginal cover  $g$  hinged at  $g'$  and securable together at their free ends, said parts cooperating substantially as described.

4. A gear-case for a sprocket-and-chain drive, involving the supplemental hood-sections  $b$ , with half-seats  $b^2$  and half-collars  $b^3$ , the supplemental hood-sections  $b'$  with elongated half-seats  $b^4$ , the inside case-sections



tions  $b^5$  uniting said hood-sections  $b$  and  $b'$  in pairs, an outside marginal cover for said hoods and inside case-sections, and a ring-like split clamp adapted to embrace said half-collars  $b^3$ , substantially as described.

5 5. A gear-case for a sprocket-and-chain drive, involving pronged and sectioned or two-part hoods, at least one of which hoods is divided or split on the line of a plane cutting  
10 its axial center in the general direction of the length of the gear-case, channel-shaped inside case-sections uniting the sections of different hoods, a channel-shaped marginal

cover for said hoods and inside case-sections, the said axially-split hood having elongated  
15 half-seats and keepers  $k^2$ , and the overlapped slot-closing plates  $k$  working between said keepers  $k^2$  and provided with the reversely-extending slots  $k'$ , substantially as and for  
20 the purposes set forth.

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

CHARLES B. HOLMES.

Witnesses:

L. C. ELMORE,

F. D. MERCHANT.