

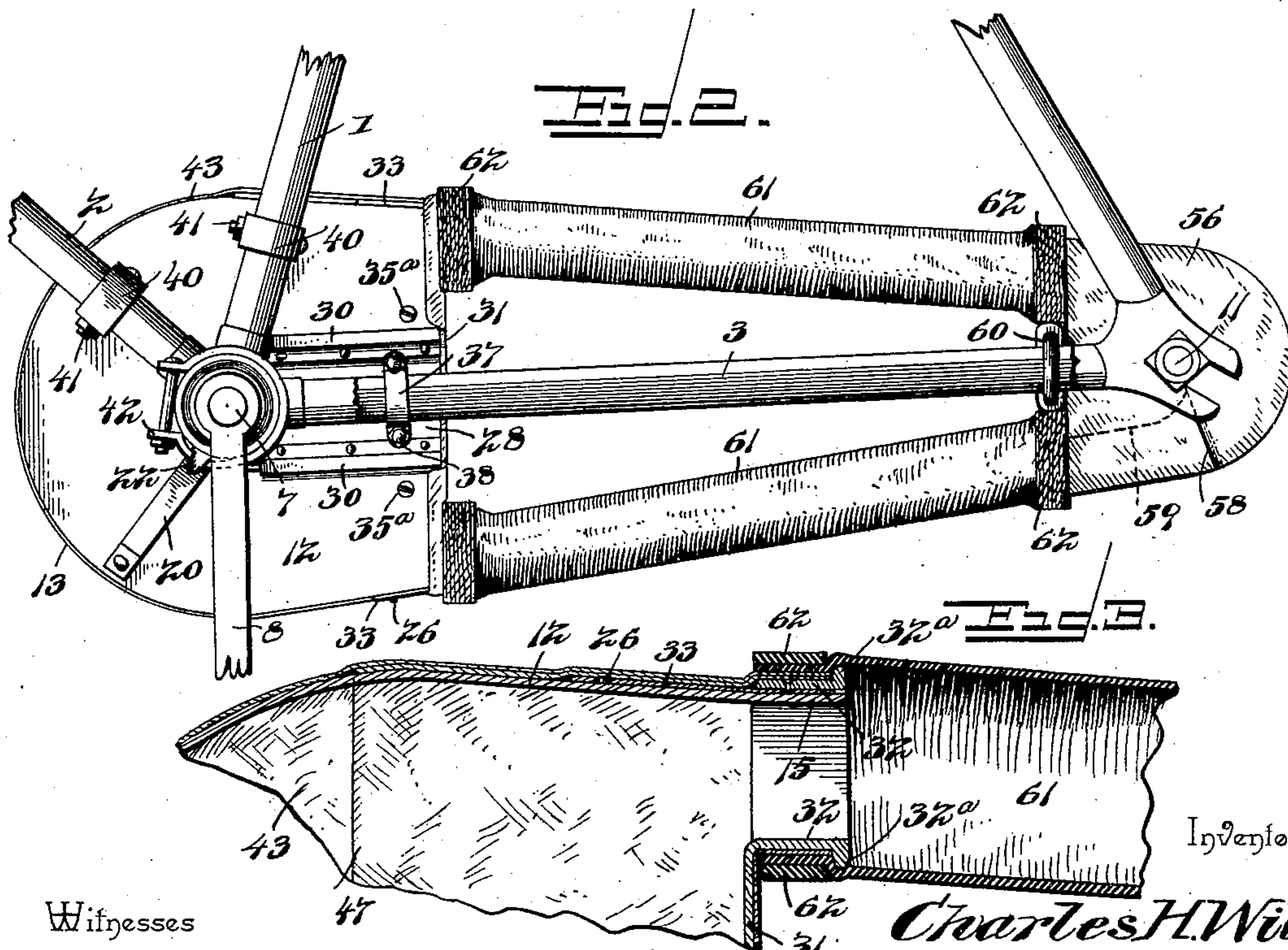
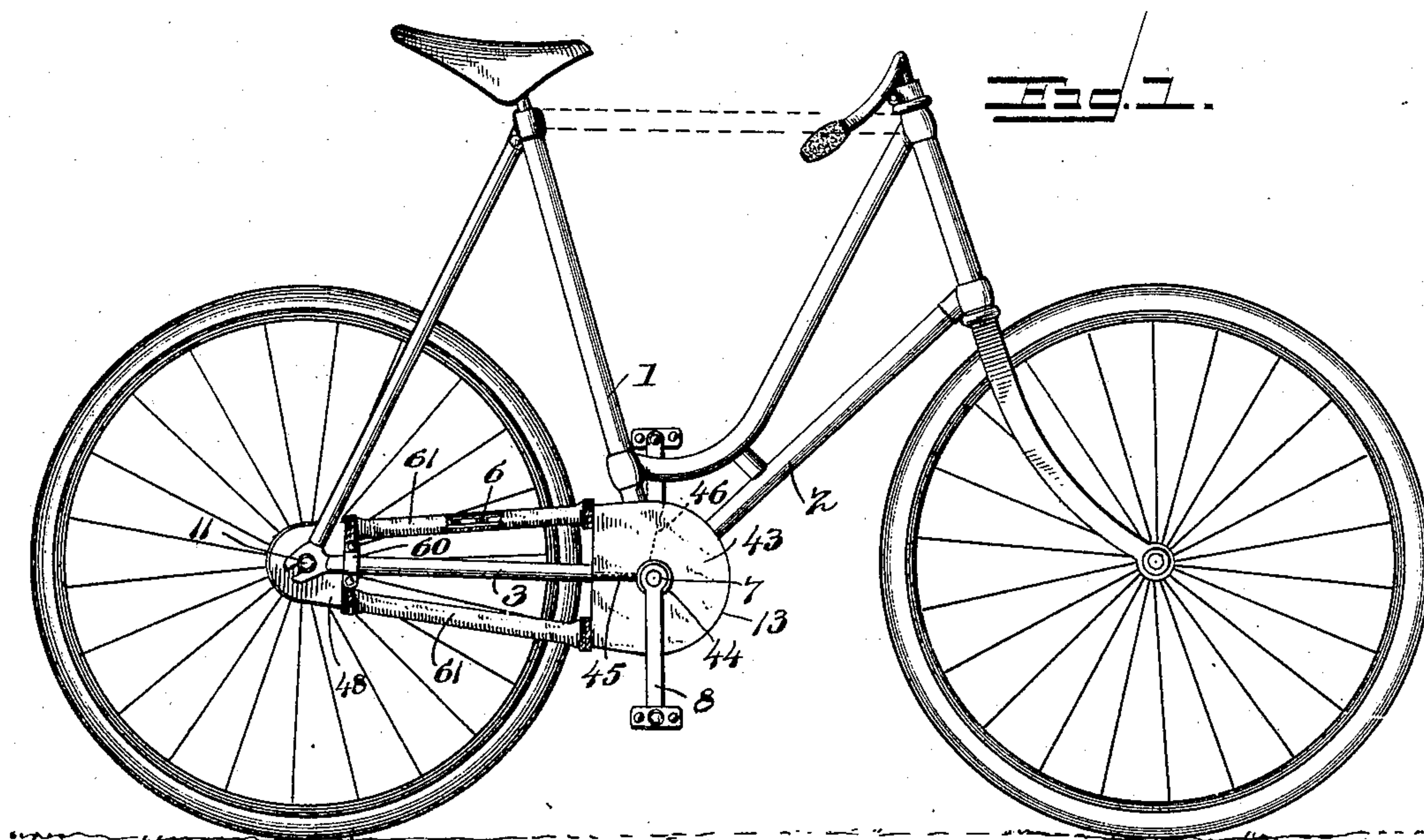
(No Model.)

2 Sheets.—Sheet 1.

C. H. WILLS.
GEAR CASING FOR BICYCLES.

No. 599,884.

Patented Mar. 1, 1898.



Witnesses

Edw. Stewart.
Edwin Cruise.

By *Two* Attorneys,

Charles H. Wills

Cañon Viejo

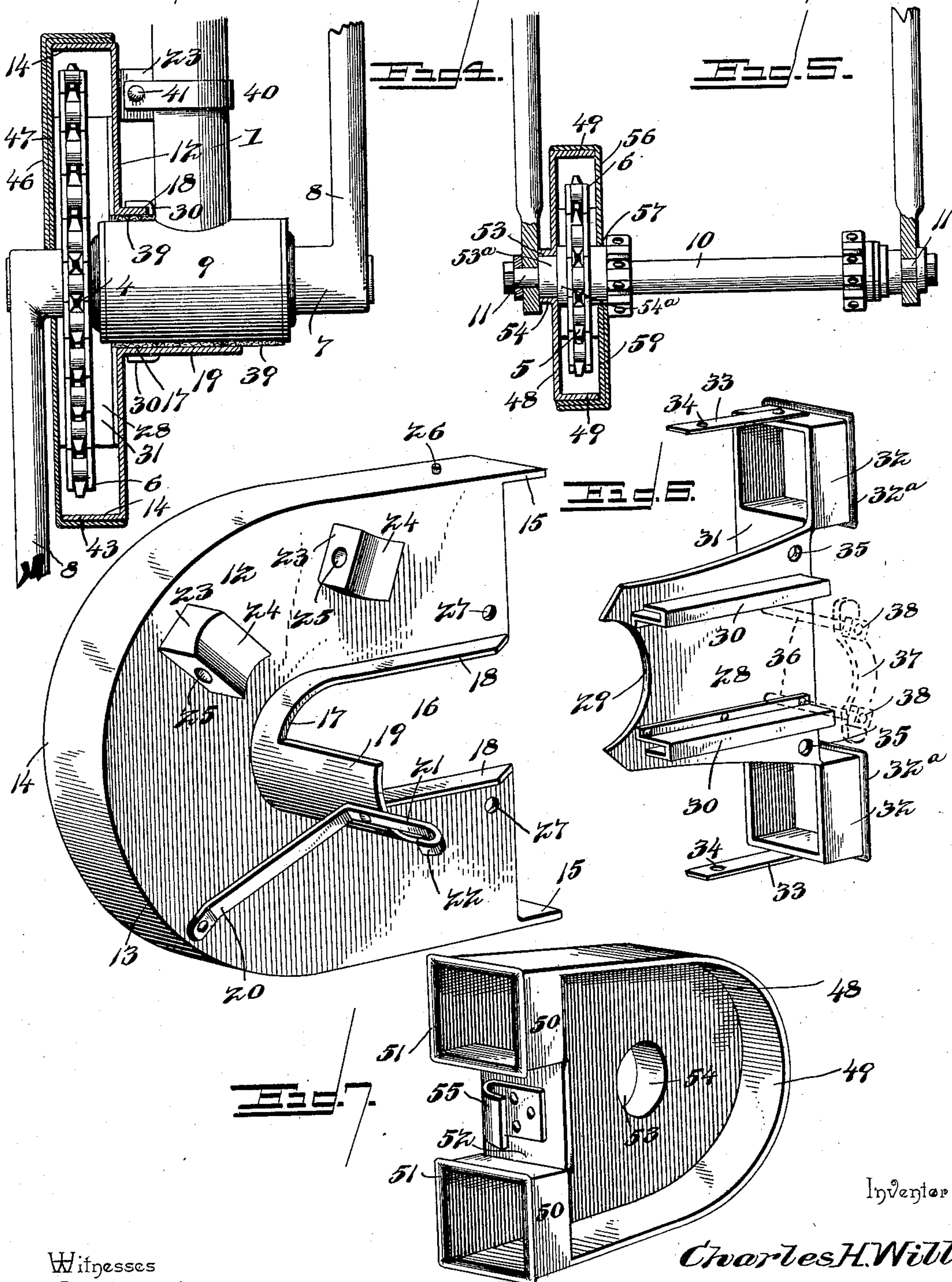
(No Model.)

2 Sheets—Sheet 2.

C. H. WILLS.
GEAR CASING FOR BICYCLES.

No. 599,884.

Patented Mar. 1, 1898.



Inventor

Charles H. Wills

Witnesses

E. H. Stewart
Edwin Cruise.

By *W. J. S.* Attorneys,

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

CHARLES H. WILLS, OF NEW PHILADELPHIA, OHIO.

GEAR-CASING FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 599,884, dated March 1, 1898.

Application filed July 23, 1897. Serial No. 645,679. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. WILLS, a citizen of the United States, residing at New Philadelphia, in the county of Tuscarawas and State of Ohio, have invented a new and useful Gear-Casing for Bicycles, of which the following is a specification.

This invention relates to gear-casings for bicycles, its object being to provide a device of this character which will be dust and mud proof, noiseless, will cause practically no friction on the gearing, and may be quickly and easily removed when necessary.

With this object in view the invention consists of the several details of construction and combination of parts hereinafter fully described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a bicycle, showing my improved gear-casing in position. Fig. 2 is a similar view of a portion of the bicycle-frame, showing the opposite side of the gear-casing. Fig. 3 is a sectional detail showing the manner of connecting the chain-tubes to the gear-casing. Fig. 4 is a sectional view of the front gear-casing. Fig. 5 is a similar view of the rear gear-casing. Fig. 6 is a view in perspective of the two metal sections used in the front gear-case separated. Fig. 7 is a perspective view of the metal portion of the rear gear-case.

Similar reference-numerals indicate similar parts in the several figures.

1 indicates the seat-post tube, 2 the reach, and 3 one of the lower runs. The front sprocket-wheel is indicated by 4 and the rear one by 5, and 6 is the sprocket-chain. The crank-axle, cranks, and the hanger are indicated by the numerals 7, 8, and 9, respectively, the hub of the rear wheel of the bicycle by 10, and its axle by 11. All these parts may be of the usual construction and form no part of my present invention.

The case for the front gear-wheel consists of two metal sections adapted to be slidably connected together. One of these sections consists of a plate 12, having a rounded front end 13, and a flange 14, projecting at a right angle from its side and front edges. This flange projects at each end beyond the rear edge of the plate 12, as indicated at 15. The

plate 12 is provided with a slot 16, which extends inwardly from its rear edge and is rounded at its inner end to correspond to the curvature of the crank-hanger 9, as indicated at 17. 18 indicates flanges at the opposite sides of the slot 16, and these flanges are continued around the inner end of the slot and laterally extended, as indicated at 19, to engage the lower portion of the crank-hanger. 20 indicates a brace, which is riveted or otherwise secured to the plate 12 at one end, and is bent at a right angle to form an arm 21, which extends parallel to the extension 19 and is riveted or otherwise secured thereto. The outer end of the arm 21 is bent to form a hook 22 for a purpose to be hereinafter referred to. 23 indicates lugs, which are secured to the outer face of the plate 12, and are provided with concave faces 24, arranged at the proper angles to engage the seat-post tube and the reach-bar. Each lug is provided with a transverse perforation, as indicated at 25, the purpose of which will be referred to hereinafter. 26 indicates pins projecting upwardly from the flange 14, near each end thereof, the purpose of which will also be referred to hereinafter. The plate 12 is provided with threaded openings 27 near its rear end on opposite sides of the slot 16, and these holes will be more particularly referred to hereinafter. The other section consists of a plate 28, having a concave recess at its front end corresponding to the curvature of the crank-hanger 9. 30 indicates guideways to receive the flanges 18, the plate 28 being adapted to slide against the inner face of the plate 12. The rear end of the plate 28 is provided with a flange 31, extending laterally therefrom in the same direction as the flange 14 extends from the plate 12, and these flanges are of substantially the same width. At the upper and lower ends of the flange 31 short sleeves or collars 32 are formed, the outer ends 32^a of which are flared or beaded, as clearly shown in Figs. 3 and 6. 33 indicates spring-strips, which are riveted or otherwise secured at one end to the respective sleeves 32, and are provided with openings 34 at their free ends to receive the pins 26 when the two sections are in proper position relatively to each other, and these spring-plates and pins serve to lock the two sections

together. The plate 28 is also provided with two threaded openings 35, adapted to register with the openings 27 when the two sections are in closed position, and screws 35^a will be inserted in these registering openings to further aid in holding the two sections together. 36 indicates pins projecting beyond the outer face of the plate 28, and the outer ends of these pins are threaded. These pins are adapted to extend on opposite sides of the lower run 3 and to receive a plate 37, which is curved at its middle portion to correspond with the curvature of the lower run 3, and nuts 38 will work on the outer ends of the pins 36 and serve to clamp the rear end of the case to the lower run 3.

39 indicates felt, which is adapted to form a packing between the outer surface of the crank-hanger and the parts of the metal case which come in contact with it. In order to fit the two sections in place to inclose the sprocket-wheel, they will be moved toward each other from opposite sides of the sprocket-wheel and the crank-hanger passed through the slot 16 until it engages the extension 19. The flanges 18 will slide in the ways 30 until the concaved recess 29 in the plate 28 is in engagement with the crank-hanger, and when in this position the openings 34 will be in position to receive the pins 26, and the threaded holes 27 and 35 in the two plates will register with each other and be in position to receive the screws 35^a. The two sections will thus be firmly secured together. The plate 37 will then be fitted over the ends of the pins 36 and be clamped in position by means of nuts 38. In order to secure the casing to the seat-post tube and the reach, U-shaped clips 40 will be fitted around these two parts of the frame and clamping-bolts 41 be passed through their ends and the perforations 25 in the lugs 23. Another clip 42 will be secured around the crank-hanger and be engaged by the hook 22 on the end of the brace-arm 21. In this manner the two sections of the casing will be firmly secured together and to the frame of the machine, but it is obvious that they can be readily disconnected from each other and from the machine-frame. During this operation it is of course to be understood that the sprocket-chain will have been separated in its length and the two ends passed through the sleeves 32.

43 indicates a diaphragm of chamois-skin or other similar flexible material, which is provided with a central opening 44 for the passage of the crank-shaft. This chamois-skin is secured in position by cementing its edges to the flanges 14 and 31 and also to the sleeves 32, it being understood that it will be so shaped as to form with the metal parts of the casing a dust-proof casing entirely inclosing the sprocket-wheel and being closely fitted around the crank-hanger and the crank-shaft.

In order to be enabled to put the gear-casing in position or to remove it without removing the crank, the piece of chamois-skin is

cut on a line with the lower run 3 from its rear edge to the opening 44, as indicated by the line 45 in Fig. 1, to form a folding section 46. An inner flap 47 is sewed or otherwise attached to the main piece of skin at the lower edge formed by the cut, and this flap will be cemented at its upper end to the flange 14. The folding section 46 will also be cemented at its upper edge to the flange 14 over the flap and at its vertical edge to the sleeve 32 and flange 31 and at its lower edge to the flap 47. By loosening the edges of the folding section 46 and the flap 47 and such edges of the main piece as are secured to the flange 31 and sleeves 32 the two sections of the case can be drawn apart from each other, and the chamois-skin will, on account of the cut 44, be enabled to pass over the crank-shaft. In this manner the casing can be removed from or fitted over the front sprocket-wheel without necessitating the entire removal of the chamois-skin and without injury to it. The flap 47 is necessary in order to afford a support to which the lower horizontal edge of the folding section 46 can be cemented and thus effectually close the opening that would otherwise exist on account of the cut 15. It is of course to be understood that in order to remove the casing the screws 35^a will have to be removed, the pins 26 be disengaged from the spring-strips 33, and the several clips which secure the casing to the framework of the machine be removed, all of which can be easily done, as will be readily understood.

The case for the rear sprocket-wheel consists of a plate 48, having a rounded rear end, and a flange 49, projecting at a right angle from its side and rear edges.

50 indicates short sleeves or collars at the front end of the case, the outer ends 51 of which are flaring or beaded, and 52 indicates a flange between the collars at the front end of the plate 48. The plate 48 is provided with a flanged opening 53, adapted to receive the outer end of the bearing 53^a, and the outer end of the flange 54 abuts against the frame-bar and the collar 54^a on the bearing engages the inner face of the plate 48. The flange 52 is provided with a hook 55, for a purpose to be referred to hereinafter.

56 indicates a piece of chamois-skin provided with an opening 57 to receive the inner end of the hub of the rear sprocket-wheel, and this skin is cut, as indicated by the line 58 in Fig. 2, and a flap 59 is secured to the main piece of chamois-skin at one edge of the cut, the construction in this respect being similar to that already described with reference to the chamois-skin on the casing for the front sprocket-wheel and being for a similar purpose.

60 indicates a clip on the rear end of the run 3 to engage the hook 55 and draw the end of the flange 54 close to the frame-bars.

In order to put the rear case in position over the rear sprocket-wheel, the frame-bars will have to be temporarily disconnected from

the rear axle to permit the metal casing to be slipped into position over the rear sprocket-wheel, and the chamois-skin will then be stretched across the inner face of the casing and cemented to the flanges thereof in a manner similar to that already described with reference to the front casing.

61 indicates flexible rubber tubes for the chains, which are fitted at each end on the sleeves 32 and 50 and secured thereon by tire-tape, (indicated at 62.)

In practice the metal part of the casing will preferably be aluminium, although I do not intend to restrict my invention to such metal, and the tubes for the chains will preferably be what is commonly known as "inner" tubing, although they may be made of any pliable waterproof material.

It will be understood that changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described the invention, what I claim is—

1. In a gear-case for bicycles, a metal case to close the periphery and one side of the sprocket-wheel, combined with a diaphragm of flexible material secured to said case to inclose the other side of the sprocket-wheel, said diaphragm comprising a main body portion having a central opening to receive a crank-shaft or other rotating member and being cut in a substantially horizontal plane from said opening to one edge to form a folding section, and a flap secured at its lower horizontal edge to the lower edge formed by said cut and adapted to be secured at its upper and outer vertical edge to the casing, and said folding section being adapted to be secured at its edges to the flap, substantially as described.

2. In a gear-case for bicycles, a metal case for the front sprocket-wheel consisting of two metal sections adapted to have a sliding connection to each other on a horizontal plane to inclose the periphery and one side of the wheel, means to detachably lock the sections together, and to the bicycle-frame, a diaphragm of flexible material secured to said case to inclose the other side of the sprocket-wheel, said diaphragm comprising a main body portion having a central opening to receive the crank-shaft, and being cut on a horizontal plane from said opening to one edge to form a folding section, and a flap secured at its lower horizontal edge to the lower edge formed by the said cut and adapted to be secured at its upper and outer vertical edges to the casing, and said folding section being adapted to be secured at its edges to the flap, substantially as described and for the purpose specified.

3. In a gear-casing for bicycles, a metal case for the front sprocket-wheel consisting of two metal sections adapted to have a sliding connection with each other, one of said sections having a slot to receive the crank-hanger, and a curved lateral flange to embrace the lower portion of the hanger, an elbow-brace connected to the casing and the lateral flange, and having a hook extending parallel with said flange, means to detachably lock the sections together, and a clip embracing the crank-hanger and engaging in said hook, substantially as described.

4. In a gear-casing for bicycles, a metal case for the front sprocket-wheel formed of two sections adapted to be slidably connected to each other, each section having a plate portion one of which has guideways and the other flanges to slide in said guideways, one section having a lateral flange around its sides and front end and the other section having sleeves at its rear end for the passage of the sprocket-chain, and a lateral flange extending from its rear end between the sleeves to partially close the rear end of the case, and said plate portions having threaded openings adapted to register with each other when the sections are in position around the sprocket-wheel, combined with screws to fit in said registering openings, perforated spring-strips secured to one casing and adapted to engage pins on the other section, and clips to lock the casing to the frame-bars of the machine, substantially as described.

5. In a gear-casing for bicycles, the combination with metal cases to respectively close the periphery and one side of the front and rear sprocket-wheels, the case for the front sprocket-wheel being in sections detachably connected together, each case having projecting sleeves or collars for the passage of the sprocket-chains, of diaphragms of chamois, or similar material, secured to said metal cases to inclose the other sides of the sprocket-wheels, and rubber tubes inclosing the chain secured at their opposite ends to the respective collars on the metal cases, and means to secure the metal cases to the frame of the machine, the construction being such that the front section of the case on the front sprocket-wheel and its diaphragm can be separately removed, without removing the remaining parts of the gear-casing, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES H. WILLS.

Witnesses:

E. F. NICHOLS,
A. E. WILLS.