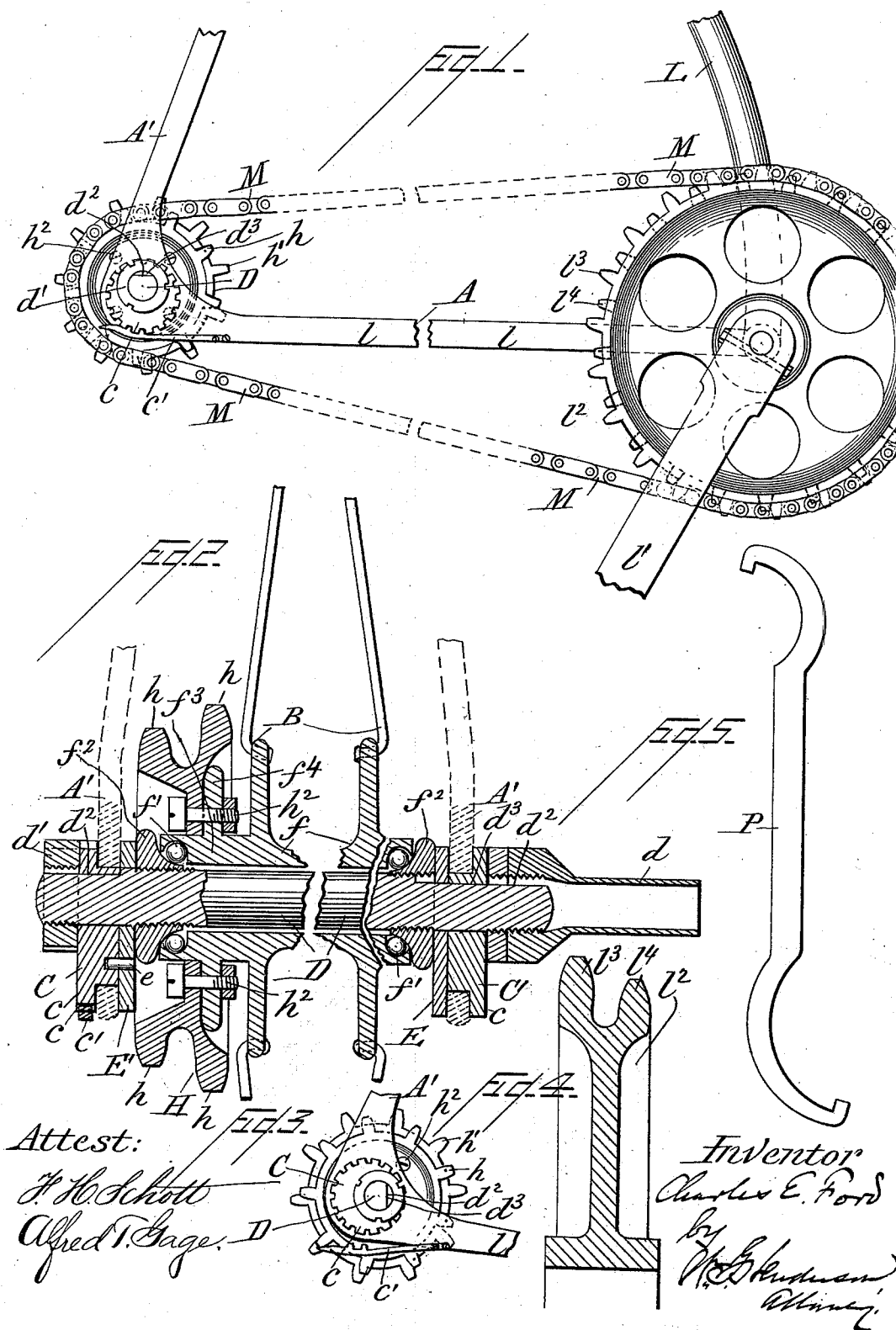


(No Model.)

C. E. FORD.
BICYCLE.

No. 519,252.

Patented May 1, 1894.



UNITED STATES PATENT OFFICE.

CHARLES EDWARD FORD, OF LEAVENWORTH, KANSAS.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 519,252, dated May 1, 1894.

Application filed May 3, 1892. Serial No. 431,711. (No model.)

To all whom it may concern:

Be it known that I, CHARLES EDWARD FORD, a citizen of the United States, residing at Leavenworth, in the county of Leavenworth and State of Kansas, have invented certain new and useful Improvements in Bicycles; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in velocipedes, and more particularly to that class termed "safety bicycles."

It has for its object the novel construction of a driving mechanism which can be so adjusted and arranged as to allow the propelling force to be applied in the manner best adapted to speeding; or to driving the machine over rough roads and up hills in the manner best adapted to the conservation of the strength of the rider.

Primarily it consists in replacing the gears of the ordinary driving mechanism with double gears; that is, each gear is replaced by a chain wheel having two toothed peripheries, the diameters of which are unequal, so that when it is desired to adapt the machine to speeding, the driving chain can be placed in engagement with the larger toothed periphery of the gear on the crank spindle and with the smaller toothed periphery of the gear attached to the driving wheel; or when it is desired to conserve the strength of the rider, the driving chain can be placed in engagement with the smaller periphery of the gear on the crank-spindle and the larger gear on the driving wheel.

It also consists in the construction of the detail mechanism and adjunctive parts necessary to the application of the gears and connections to the purpose, and it further consists in the novel combination and arrangement of parts such as will be hereinafter more fully described, pointed out in the appended claims, and illustrated in the accompanying drawings.

In the accompanying drawings in which similar letters of reference designate corresponding parts, Figure 1 is a side elevation

of a driving mechanism embodying the invention, showing portions of the supporting frames and pedal cranks broken away. Fig. 2 is a detail view showing a transverse section through the rear wheel, taken through the hub of the same and of the supporting spindle and its adjacent parts. Fig. 3 is a detail view, showing a side elevation of the wheel gear and a portion of its supporting frame, the gear being in a position to allow the adjustment of the driving chain. Fig. 4 is a detail view showing a transverse section of one half of one of the gears. Fig. 5 is a plan view of the wrench used in adjusting the gears.

Referring to the drawings, A designates the supporting frame, only so much of it being shown as is necessary to illustrate the invention.

A' designates the rear fork of the frame between the lower ends of which the wheel B is journaled.

C C' designate respectively two sleeves, each of which is journaled in one of the lower ends of the fork A' and has projecting from its outer end the annular flange c, the inner face of which rests against the fork. The flange of the sleeve C has its outer periphery notched. A spring catch c' is secured to the frame in any suitable manner and is adapted to engage with the notched flange c to hold the sleeve in any position to which it may be turned.

D designates a spindle which has its ends eccentrically mounted in sleeves C C', and which has secured on one end the step d, and on the other end the nut d', the step and nut serving to secure the spindle and the different parts carried by it, in place. Each end of the spindle as it passes through its sleeve is flattened as at d² and registers with a projection d³ of the inner periphery of the sleeve so that the sleeves and the spindle cannot rotate with relation to each other.

E and E' designate plates or washers carried on each end of the spindle respectively, inside of the ends of the fork and serve to keep the wheel in its proper position on the spindle. They are of the same diameter as the sleeves C C' and are similarly mounted, with relation to eccentricity, on the spindle, and are so secured as to have their periph-

eries parallel with the peripheries of the sleeves. The plate E is secured in place by continuing the flattened portion d^2 of the end of the spindle inwardly and providing its inner periphery with a depressed portion to register with the flat portion. The plate E' is secured in place by attaching it to the sleeve C on its side, by a lug e, so that it will turn with the said sleeve.

B designates the rear or driving wheel, having a hub f journaled on the spindle D, being provided with ball bearings f' , and the whole being secured and adjusted on the spindle by the screw caps f^2, f^2 . One end f^3 of the hub has projecting from its periphery, the annular flange f^4 , the relative proportion and adjustment of the several parts being such that the wheel will be carried in the center of the frame.

H designates a gear wheel having two toothed peripheries h and h' , the diameter of the inner of which is greater than the outer. It is mounted on the outer end of the hub and is secured in place by the bolts h^2, h^2 passing through its web and the annular flange f^4 .

L designates the support, which together with the connecting rods l, l , carries the spindle to which the pedal cranks l' are attached. This spindle carries a gear wheel l^2 , somewhat similar in construction to that carried by the driving wheel, but of much greater diameter. The gear wheel l^2 has the toothed peripheries l^3 and l^4 of unequal diameter, and it is placed so that the side having the larger periphery will be on the same side of the machine as the smaller periphery of the gear wheel, H. The relative size of the toothed peripheries of the gear wheels is such that the chain M can be carried by either the smaller periphery of one of the gears and the larger periphery of the other or vice versa.

In the present instance the driving chain is shown as being carried on the smaller periphery of the gear on the driving wheel and the larger periphery of the gear on the driving spindle, which arrangement adapts the machine to speeding. If it should be desired to change the driving chain to the larger periphery of the gear on the driving wheel and the smaller gear of the driving spindle, to adapt the machine to rough work, it can be very quickly done in the following manner: The spring catch c' is disengaged from the sleeve C and by means of the wrench P the sleeve is rotated, which through its eccentric and connections, will turn the spindle of the driving wheel so as to bring the two gears nearer together and allow the transfer of the driving chain, after this has been done, the spindle is turned back and the chain firmly secured against disengagement, the spring catch being released to hold the sleeve C against rotation.

Having described my invention and set forth its merits, what I claim is—

1. In a velocipede, a driving mechanism consisting of two gear wheels mounted re-

spectively on the crank spindle and the hub of the driving wheel, each of said wheels having two toothed peripheries of unequal diameter arranged on the same side of the driving wheel to permit the driving chain to be shifted from one periphery to the other of the gear wheels without removing the driving wheel from its bearings, an eccentric mounted to normally hold one of said gear wheels in a position to keep the drive chain taut and when moved in the opposite direction to adjust both peripheries of one wheel toward the other gear wheel to permit the drive chain to be shifted from one set of peripheries to the other, and the drive chain, substantially as and for the purposes described.

2. In a velocipede, the combination of the supporting frame, the driving wheel, the sleeves rotatably mounted in the said frame, the driving wheel spindle eccentrically mounted in said sleeves with its eccentricity such as normally to hold one of two gear wheels in a position to keep the drive chain taut and when shifted in the opposite direction to adjust one gear wheel toward the other gear wheel to permit the drive chain to be transferred from one set of gear-wheels to the other, the crank spindle, the gear wheels mounted on said crank spindle and the hub of said wheel respectively, each of said gears having two toothed peripheries and both being on the same side of the driving wheel, whereby the driving chain can be shifted from one to the other periphery of the gear wheels without removing the driving wheel from its bearings, and the driving chain, substantially as and for the purposes described.

3. In a velocipede, the combination of the supporting frame, the driving wheel, sleeves rotatably mounted in said frame, one of the sleeves having a notched flange, the driving wheel spindle eccentrically mounted in said sleeves, with its eccentricity such as normally to hold one of two gear wheels in a position to keep the drive chain taut and when shifted in the opposite direction to adjust one wheel toward the other gear wheel to permit the drive chain to be transferred from one set of gear wheels to the other, holding means adapted to engage said notched flange to hold the sleeves against rotation, the crank spindle, the gear wheels mounted on said crank spindle and the hub of said wheel, respectively, each of said gears having two toothed peripheries and both being on the same side of the driving wheel to permit the driving chain to be shifted from one to the other periphery of the gear wheels without removing the driving wheel from its bearings, and the driving chain, substantially as and for the purposes described.

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

CHARLES EDWARD FORD.

Witnesses:

W. S. ALBRIGHT,
E. WIELFEKUBLER.