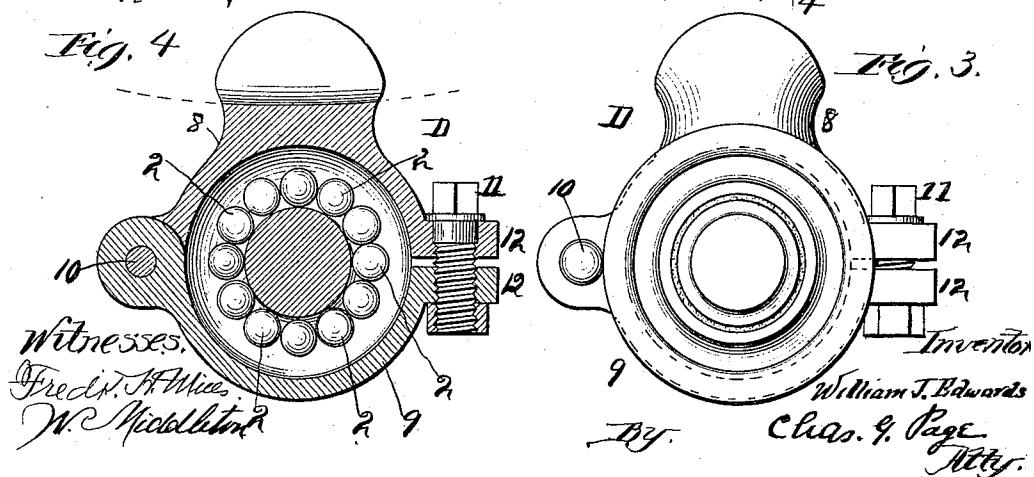
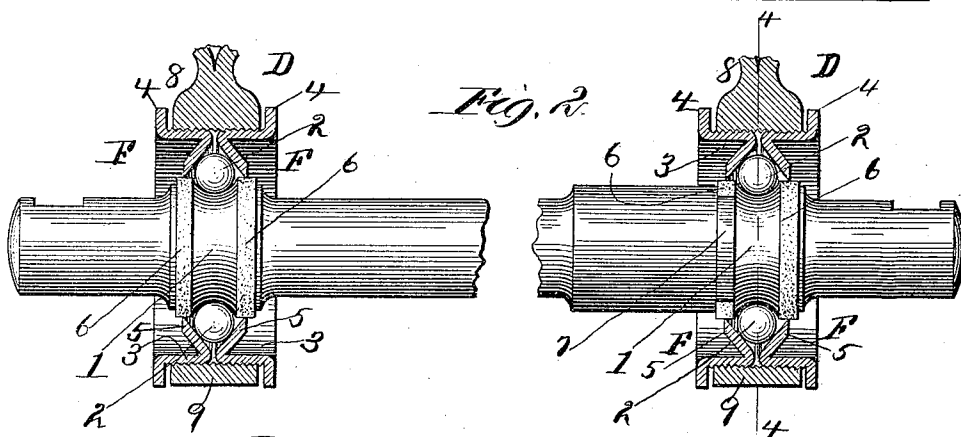
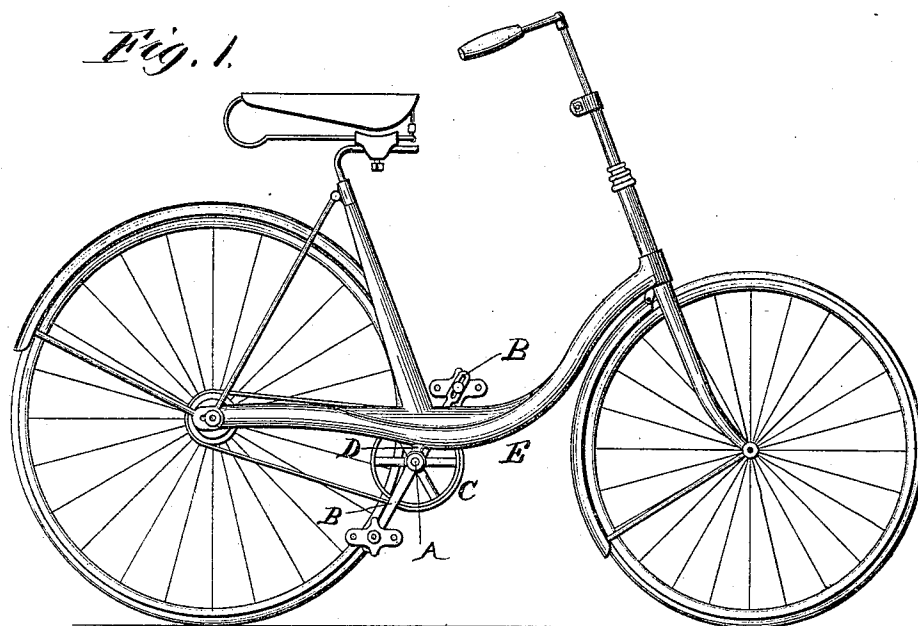


W. J. EDWARDS.
VELOCIPEDÉ.

Patented Dec. 29, 1891.



UNITED STATES PATENT OFFICE.

WILLIAM J. EDWARDS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE UNION MANUFACTURING AND PLATING COMPANY, OF SAME PLACE.

VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 466,134, dated December 29, 1891.

Original application filed April 14, 1890. Serial No. 347,893. Divided and this application filed September 1, 1891. Serial No. 404,406. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. EDWARDS, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Velocipedes, of which the following is a specification.

This application is made as a division of my application for Letters Patent of the United States filed April 14, 1890, and serially numbered 347,893, and relates to the hangers provided with bearings and dust-guards for the crank or pedal axle.

My said invention consists in matters hereinafter set forth, and illustrated in the accompanying drawings, in which—

Figure 1 represents in side elevation a bicycle to which my invention is understood to be applied. Fig. 2 represents a vertical central section through the two hangers on a plane coincident with the axis of the crank-axle, which latter is shown in elevation and for convenience of illustration broken away at the middle. Fig. 3 is an end view of one of the axles and one of the hangers. Fig. 4 is a section on line 4 4 in Fig. 2.

The crank-axle A is provided with the cranks B, Fig. 1, and a sprocket C, and is arranged to extend through hangers D, which depend from the reach E of the machine. The ball-bearings for the pedal-crank shaft are preferably duplicates of one another, as in Fig. 2, and hence a description of one will serve for both. With reference, therefore, to either of said bearings, the axle is provided with an annular groove or depression 1, which is arranged to form around the axle an annular inner bearing for the anti-friction balls 2, which are arranged in continuous series around the axle and within an opening through which the hanger D is provided. The opening in the hanger is made somewhat larger than the axle, and has its annular wall threaded to receive the threaded cylindric portions 3 of a couple of adjustable sleeves or caps F. These adjustable caps may be described as threaded cylindric caps having flanged ends. The flanges 4 at the outer ends of the caps are turned outwardly at or substantially at right angles to the cylindric body portions 3, so as to lie alongside of the

two sides of the hanger, and thereby form guards serving to prevent dust from the hangers, it being observed that in practice these caps lie closely against the hanger. The flanges 5 at the inner ends of the caps are inclined or formed oblique to the length of the caps and may be said to slope toward the outward flanged ends thereof, so that when the two caps are introduced into the hanger, opening, respectively, from the opposite sides of the hanger, the two flanges 5 will diverge from their line of union with the cylindric body portions of the caps toward the axle. By such arrangement the annular space between the inner opposing inclined sides of the flanges 5 serves to receive such portions of the balls as are not within the annular space of the axle-groove, and said inclined sides constitute a two-part adjustable outer bearing for the balls.

The caps can be adjusted with great nicety with reference to the balls and can be readily removed in case any one or more of the balls should become crushed or injured.

The hangers may be made of any suitable metal; but I prefer forming the caps of pressed high-grade steel, in which way they can be made extremely hard and durable. By thus pressing out the steel caps all danger by fire-cracking is avoided, and should a flaw for any reason whatsoever occur in a cap it can, if detected before its application to the machine, be thrown aside at a trifling loss, while on the other hand, should a defect be noticed after its application to the machine, it can be readily removed and replaced by another cap at small cost. It will be evident that if any portion of the hanger were used as a bearing-surface for the balls a defect in the same resulting from tempering to get a hardened bearing-surface would necessitate a new hanger in case the defect should be noticed prior to the operation of welding the hanger to the reach, (and this would be objectionable, since a hanger costs more than a cap,) and in case the defect should be discovered after a hanger has been united to the reach then the provision of a new reach or backbone would become necessary. As a means for rendering these bearings dust-proof, I groove the axle at opposite sides of the groove 1, so as to

form seats for annular bands *e* of felt or sheepskin with the wool on or other suitable soft or yielding material when thus applied to form dust-guards for excluding dust and moisture from the bearing. The annular grooves which receive the "dust-guards" 6 (by which term I include their use as moisture-guards) prevent them from slipping along the axle, a portion of one of said grooves being shown at 7, Fig. 2, wherein a part of one of the annular dust-guards is broken away for convenience in illustration. The inner annular edges of the flanges 5 of the caps should and in practice will set to some extent into the material of which the dust-guards are formed, so as to prevent dust from passing between the guards and the flanges. The flanges may also be beveled or sharpened along their inner edges, so that they will more readily set in the dust-guards, and while as a matter of course the dust-guards could be formed of leather or the like, either previously channeled to receive the inner edges of the flanges or channeled by a limited cutting or wearing action on the part of the flanges, I prefer a material, such as felt or like yielding material, into which the flanges may sink to a depth suitable to form an effective dust-proof guard.

Broadly considered, the hangers are simply portions of the frame adapted to serve as bearings for the caps, and in this respect the hangers may each be formed of a single piece; but I prefer to form each hanger of two parts, whereof the upper part 8 is welded or otherwise suitably united to the reach, while the lower part 9 is hinged to the upper part by a pivot 10 at one side of the axle and at the opposite side of the axle adjustably held as a jaw to said upper part by a threaded bolt 11, which passes through lugs 12 on the two parts of the hanger. By such arrangement the area of the openings through the hangers can be adapted to the diameter of the caps, and in case it should be desired to remove the caps from a hanger such operation can be facilitated by loosening the hanger-bolt 11.

While I have described my invention as applied to the crank or pedal axles, it is understood that it can be either or both of the wheel-axles, the wheel in such case being received upon the axle.

What I claim as my invention is—

1. The combination, in a velocipede, of a threaded cylindric socket-bearing, an axle extending centrally through the socket-bearing and provided with an annular groove forming an inner bearing for a set of anti-friction balls, and a couple of externally-threaded cylindric caps both engaging and screwed into the threaded socket-bearing from opposite ends thereof and having their inner ends provided with annular flanges which diverge

from the adjacent inner ends of the caps toward the axle and forming an outer divided bearing for the anti-friction balls, substantially as described.

2. The combination, in a velocipede, of a hanger provided with a threaded cylindric socket, an axle extending centrally through the socket and provided with an annular groove 1, and a couple of externally-threaded cylindric caps F, directly engaging and screwed into the threaded socket from opposite ends thereof, said caps being formed with their outer ends bent outwardly to form flanges 4, arranged to lie along the sides of the hanger and with their inner ends bent to form flanges 5, which diverge toward the axle, and a set of anti-friction balls arranged between the axle and said flanges 5, substantially as described.

3. In a velocipede, the axle provided with a couple of annular dust-guards of yielding material and an annular groove arranged between the two dust-guards and forming the inner bearing for a set of anti-friction balls, substantially as described.

4. The combination, in a velocipede, of the axle provided with an annular groove and a couple of annular dust-guards, and an annular groove arranged between the dust-guards and forming the inner bearing for a set of anti-friction balls, and a set of anti-friction balls confined within an annular space which is formed between the inner bearings on the axle and an annular outer bearing and closed, as at *a*, against the entrance of dust and moisture by said annular dust-guards, substantially as described.

5. In a velocipede, the combination of the axle provided with a couple of annular dust-guards of yielding material, and an annular groove arranged between the dust-guards to provide the inner bearing for a set of anti-friction balls, and the outer inclined bearings 5, arranged to meet the dust-guards, substantially as described.

6. In a velocipede, the combination of the axle provided with a groove 1 and an annular dust-guard 6, of yielding material, and a bearing 5, meeting said dust-guard, substantially as set forth.

7. In a velocipede, the combination of the axle provided with a couple of annular dust-guards 6 and a groove 1, arranged between the same, caps adjustably held in a bearing and having inner end flanges 5, forming bearings which meet the dust-guards, and a set of anti-friction balls arranged between the axle and said bearings, substantially as described.

WILLIAM J. EDWARDS.

Witnesses:

CHAS. G. PAGE,
WESTERVELT MIDDLETON.