

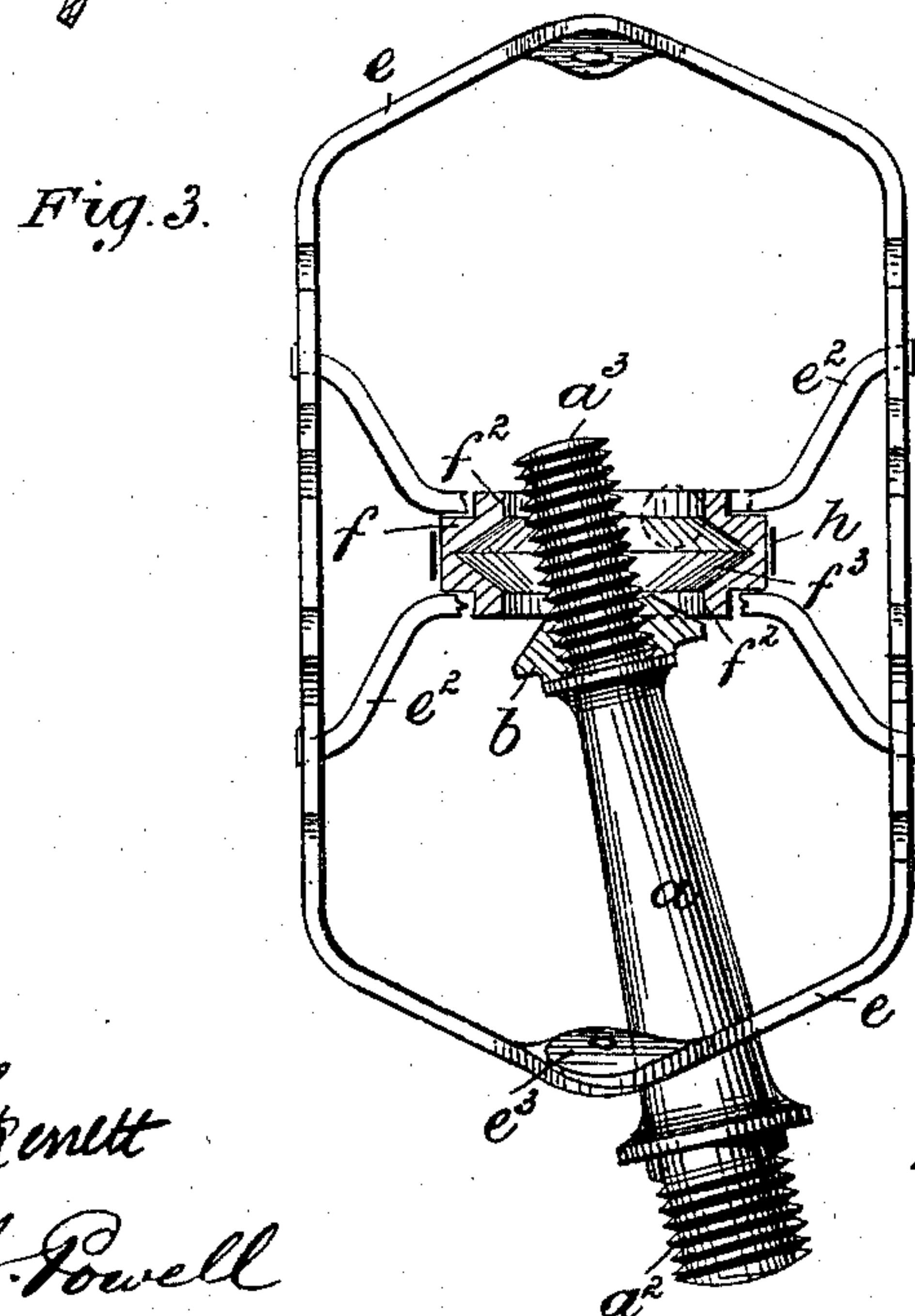
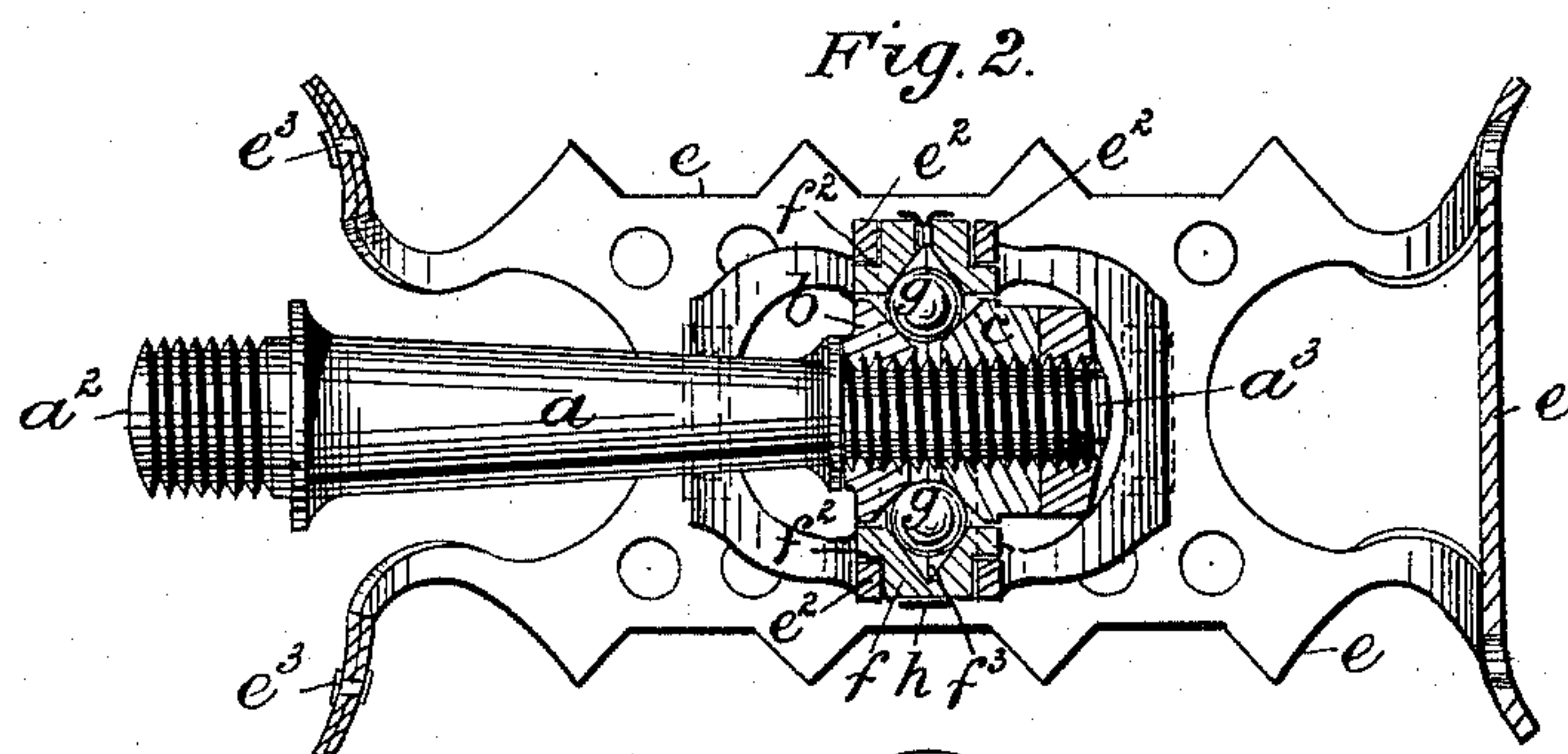
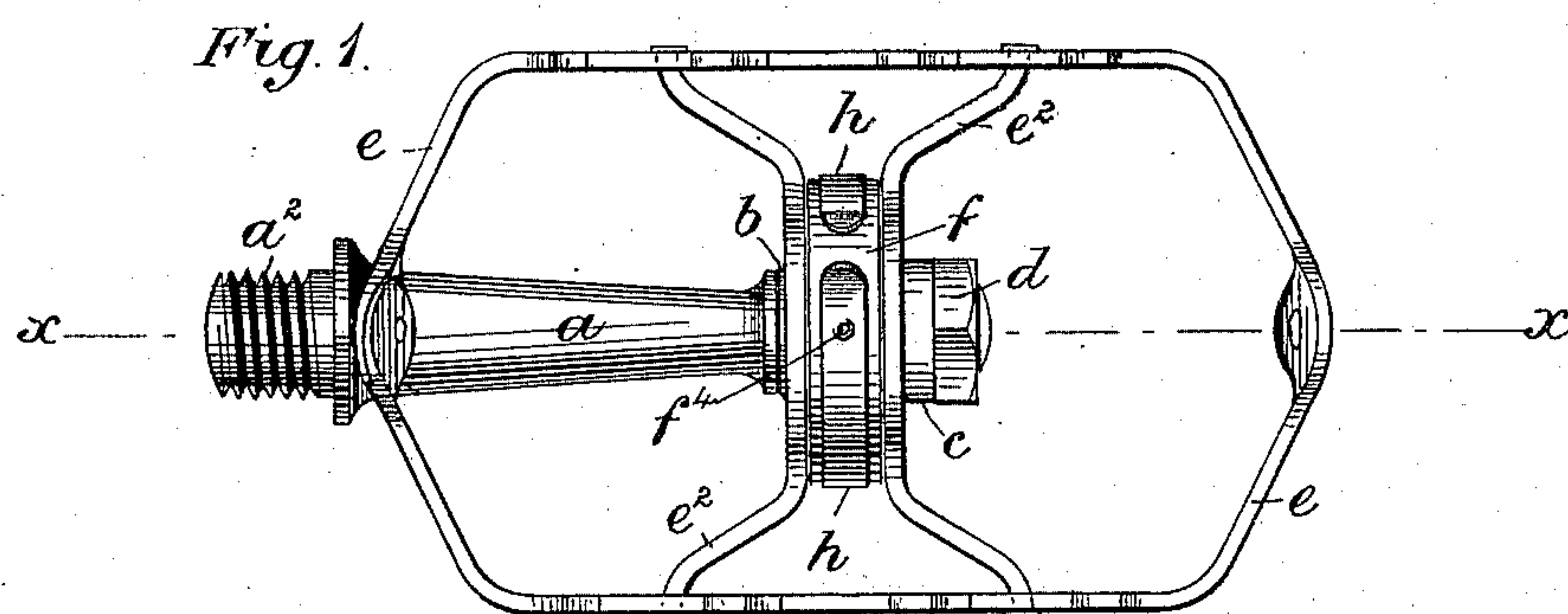
(No Model.)

2 Sheets—Sheet 1.

W. J. LLOYD & W. PRIEST.
PEDAL FOR BICYCLES.

No. 598,675

Patented Feb. 8, 1898.



Witnesses;—

Richard Skene
Arthur J. Powell

Inventors;—

Walter John Lloyd
William Priest

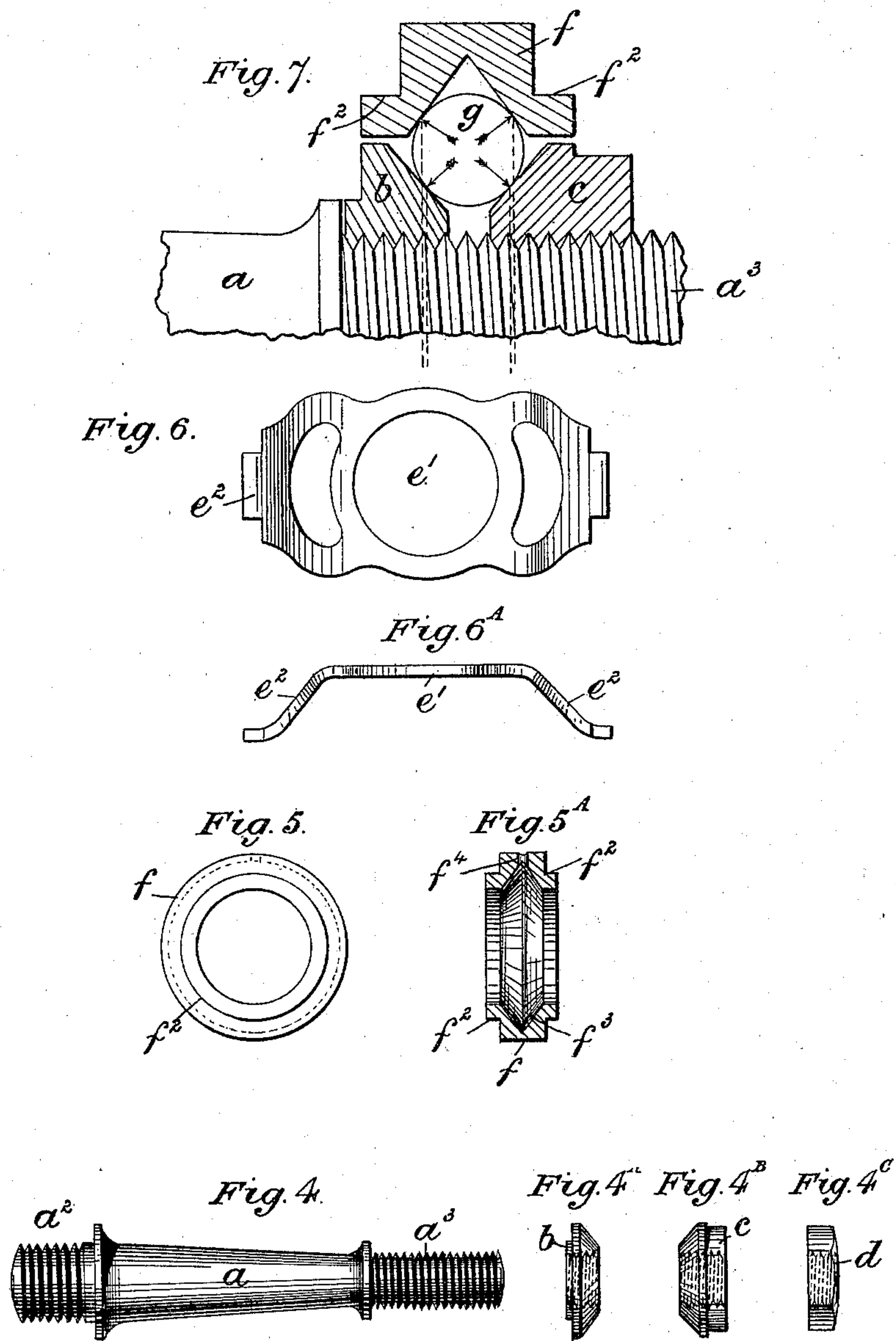
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UNITED STATES PATENT OFFICE.

WALTER JOHN LLOYD AND WILLIAM PRIEST, OF BIRMINGHAM, ENGLAND.

PEDAL FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 598,675, dated February 8, 1898.

Application filed January 23, 1896. Serial No. 576,494. (No model.) Patented in Belgium November 8, 1895, No. 118,270.

To all whom it may concern:

Be it known that we, WALTER JOHN LLOYD and WILLIAM PRIEST, subjects of the Queen of Great Britain, residing at Birmingham, England, have invented certain new and useful Improvements in Pedals for Bicycles, Tricycles, and other Velocipedes, (for which we have obtained Letters Patent of Belgium, No. 118,270, dated November 8, 1895;) and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to pedals for bicycles, tricycles, and other velocipedes in which a short pedal pin or spindle and a central ball-bearing are employed; and our invention consists of the construction and arrangement hereinafter described of the parts of the said pedals whereby the manufacture of the pedals is simplified and their efficiency increased. The bearing is also made oil-containing, thereby rendering the frequent lubrication of the said bearing unnecessary.

In constructing a pedal according to our invention we arrange on each side of the middle of the pedal-frame two metallic bands or stays extending from side to side of the said pedal-frame, the ends of the said stays being connected to the sides, preferably by riveting. These stays, as will be clearly seen in Figures 1 and 3, extend obliquely outward from their central portion, thus forming braces to the ring supported by said stays and serving to retain the spring-sleeve *h* on said ring. The middle part of each stay has a circular hole pierced in it, the said middle holes of the stays fitting upon shoulders at opposite faces of a metallic ring occupying the middle of the pedal-frame. The ring consists on its external surface of a short middle cylinder and short cylinders of less diameter extending at each end thereof, all being integral. The inner side of the said middle ring is grooved, the groove being V-shaped and constituting one part of the ball-race. The other part of the ball-race is formed by two loose cones screwed or otherwise fixed onto the outer screwed end of the pedal-pin, the smaller ends of the said cones being presented to each other.

Fig. 1 of the accompanying drawings represents in plan a rat-trap cycle-pedal con-

structed according to our invention. Fig. 2 is a longitudinal section of the same, taken on the line *x x*, Fig. 1. Fig. 3 represents, partly in side elevation and partly in section, the position of the parts with respect to each other during the introduction of the balls into the bearing. Figs. 4, 4^A, 4^B, and 4^C represent in side elevation the short pedal pin or spindle with the cones and screw-nut detached from its outer screwed end. Fig. 5 represents in end elevation, and Fig. 5^A in vertical section, the middle ring of the pedal-frame constituting the outer part of the pedal-bearing. Fig. 6 represents in elevation, and Fig. 6^A in edge view, one of the middle metallic stays, by which stays the ring, Figs. 5 and 5^A, is fixed to the pedal-frame. Fig. 7 represents in cross-section, drawn to a larger scale, the middle ring and the two cones forming together the ball-race of the bearing.

The same letters of reference indicate the same parts in the several figures of the drawings.

a a² a³ is the short pedal pin or spindle, *a* being the body of the spindle, *a²* the inner screwed end by which the said pedal-spindle is fixed to the crank, and *a³* the outer screwed end, on which outer end the two cones *b c* are screwed, the outer cone *c* being fixed or locked after the adjustment of the bearing by the screw-nut *d* or otherwise locked.

The frame *e* of the pedal has near its middle the metallic stays or bands *e² e²*, which stays carry the middle ring *f*, constituting the outer part of the bearing, circular holes *e' e'* in the stays *e²* taking upon shoulders *f² f²* of the ring *f*. The ring *f* has an internal V-shaped groove *f³*, which constitutes with the conical faces of the cones *b c* the race for the balls *g* of the bearing. The V-shaped groove outside and inside the bearing-balls thus forms what may be called, practically, a "diamond-shaped" way, in which the balls are inclosed, and by reason of the form of the ball or race all rocking or depression of the outer or inner end of the frame with reference to the pin is prevented.

f⁴ is the hole in the ring *f*, through which the lubricating-oil is introduced into the bearing, the said oil collecting at the bottom of the said ring and forming a bath, through which the balls of the bearing work on the motion

of the pedal-frame on its spindle. We prefer to employ balls in the bearing of about three-sixteenths of an inch in diameter; but we do not limit ourselves to any particular size of balls.

h is a tight-fitting cover in form of a broken ring, which fits the outside of ring f . This broken ring h may be rotated on the ring f for closing the hole f^4 , thereby making the bearing practically dust-proof.

We prefer to make the frame e of the pedal of one piece of stamped and pierced sheet metal bent into the figure represented in the plan Fig. 1, the ends being riveted at $e^3 e^3$; but we do not limit ourselves to a frame of this construction.

The parts of the pedal are put together in the following manner: The inner cone b is screwed or otherwise fixed on the outer screwed end a^3 of the pedal-pin a until it abuts against the shoulder at which the screwed end a^3 of the pedal-pin a sets in. The screwed end of the pedal-pin a , held in a vertical position, is passed into the ring f to a distance somewhat less than its normal position, so that the said pedal-pin may be inclined to the axis of the said ring f , as represented in Fig. 3. By inclining the pedal-pin a the balls g can readily be introduced between the interior of the said ring and the cone b on the pedal-pin. By restoring the pedal-pin a to its normal position with respect to the ring the second or outer cone c may be screwed on the screwed end of the pin. By screwing the lock-nut d on the extreme end of the pedal-pin a the parts of the bearing are secured in position.

Our invention may be applied to pedals having rubber treads as well as to rat-trap pedals.

We are aware that a single central bearing pedal has been used prior to our invention, and we lay no claim to a single central bearing pedal, excepting in the respects herein-after pointed out and claimed, and we believe that no practical construction or arrangement of a central bearing pedal in which the pedal-frame is supported by a single series of balls has been devised prior to our invention.

The essential feature of our invention resides in the ball-race. The ball-race as heretofore constructed in pedals of this class is circular in cross-section, and consequently the balls must be of a size corresponding with the internal diameter of the ball-race. Each ball has a complete circle in contact with the ball-race, in consequence of which great friction and wear necessarily results, and hence the pedal soon becomes loose and shaky on the pedal-pin. Further, the bearing herein-before referred to does not admit of adjust-

ment to compensate for wear, so that as soon as the perfect fit of the balls and race absolutely necessary no longer obtain the pedal is rendered practically useless.

It will be seen by an examination of our drawings that we provide a ball-race of a diamond shape in cross-section by the use of which each ball touches the race at four points only. (See arrows, Fig. 7.) Hence friction in the bearing is reduced to a minimum and the balls are perfectly free to rotate in the race. As the balls touch the opposite sides of the grooves forming the race, lines of support (see the dotted lines in Fig. 7) are obtained and there thus results, with the single series of balls, the same advantages as attend the use of two series of balls. It will also be seen that our arrangement of the parts of the ball-race permits of a perfect adjustment to compensate for wear, the two collars or cones $b c$ being brought closer together when adjustment is required, thereby forcing the balls outward into the V-shaped groove in the ring f .

Our method of constructing the grooved ring f and attaching it to the pedal by the separate or detached stays or bands $e^2 e^2$ possesses special advantages—namely, the said ring only requires to be hardened and tempered. The elasticity and strength of the stays $e^2 e^2$ are consequently not interfered with.

Having now particularly described and ascertained the nature of our invention and in what manner the same is to be performed, we declare that we claim as our invention—

1. In a pedal for cycles and the like, the frame, the two metallic stays or bands extending from side to side of said frame and rigidly connected thereto, the middle part of said stays each having a hole therein, the metallic ring having cylindrical ends which enter said holes in said stays, said ring having a groove or ball-receptacle therein, in combination with the pedal pin or spindle having adjustable cones thereon, and the balls interposed between said cones and ring, all substantially as described.

2. In a bicycle-pedal, the pedal-frame, the short pedal pin or spindle, braces extending across the frame, and the single ball-bearing interposed between the pedal-pin and braces, said bearing consisting of a ring with a V-shaped groove therein surrounding the balls, and rings with conical ends between which the balls are inclosed, said rings connected to the pedal-pin, substantially as described.

WALTER JOHN LLOYD. [L. S.]
WILLIAM PRIEST. [L. S.]

Witnesses:

RICHARD SKERRETT,
ARTHUR J. POWELL.