

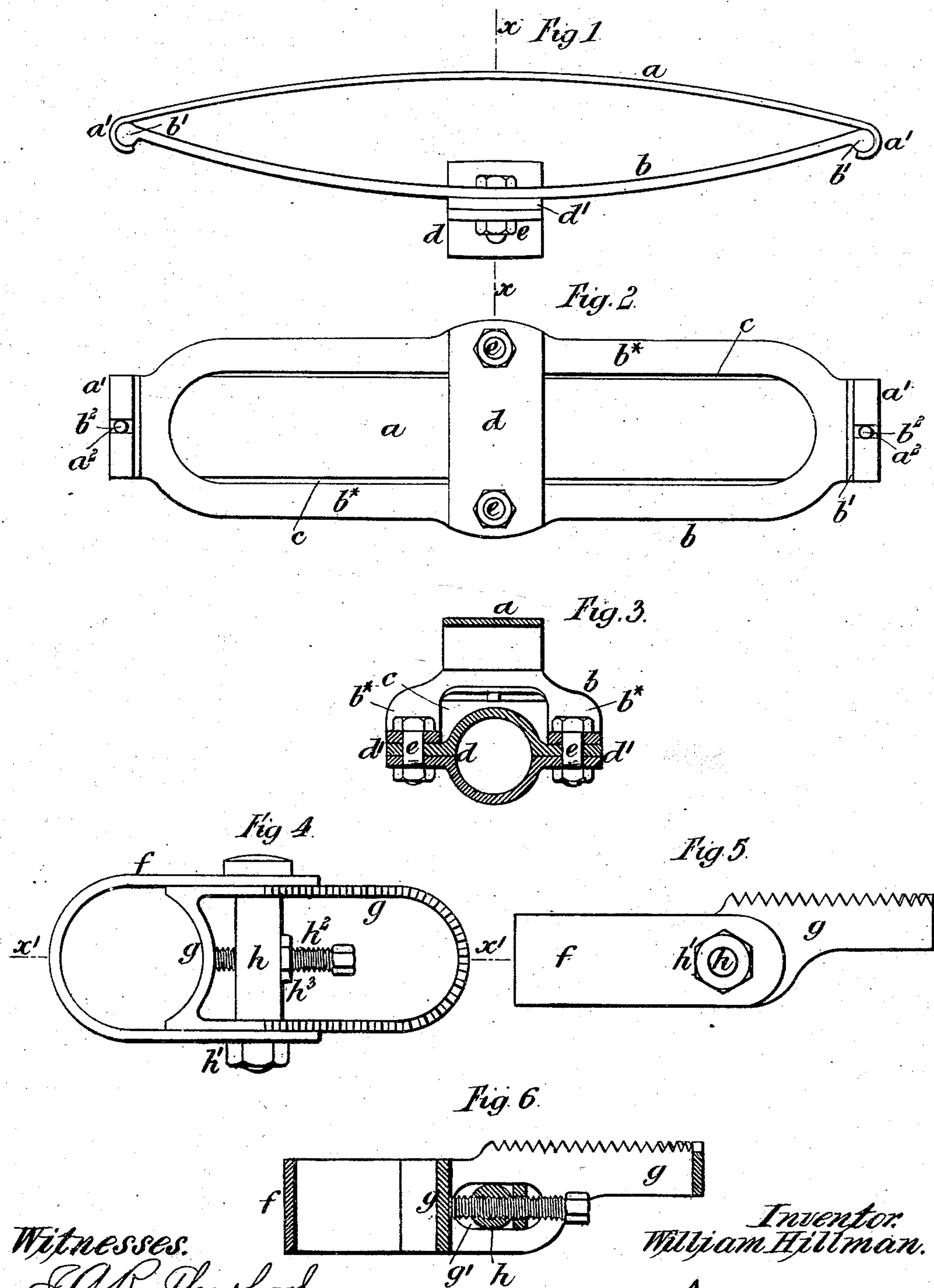
(No Model.)

3 Sheets—Sheet 1.

W. HILLMAN.  
Velocipede.

No. 241,361.

Patented May 10, 1881.



Witnesses.

J. A. Rutherford  
Robert Everett.

Inventor.  
William Hillman.

by James L. Norris.  
Atty.

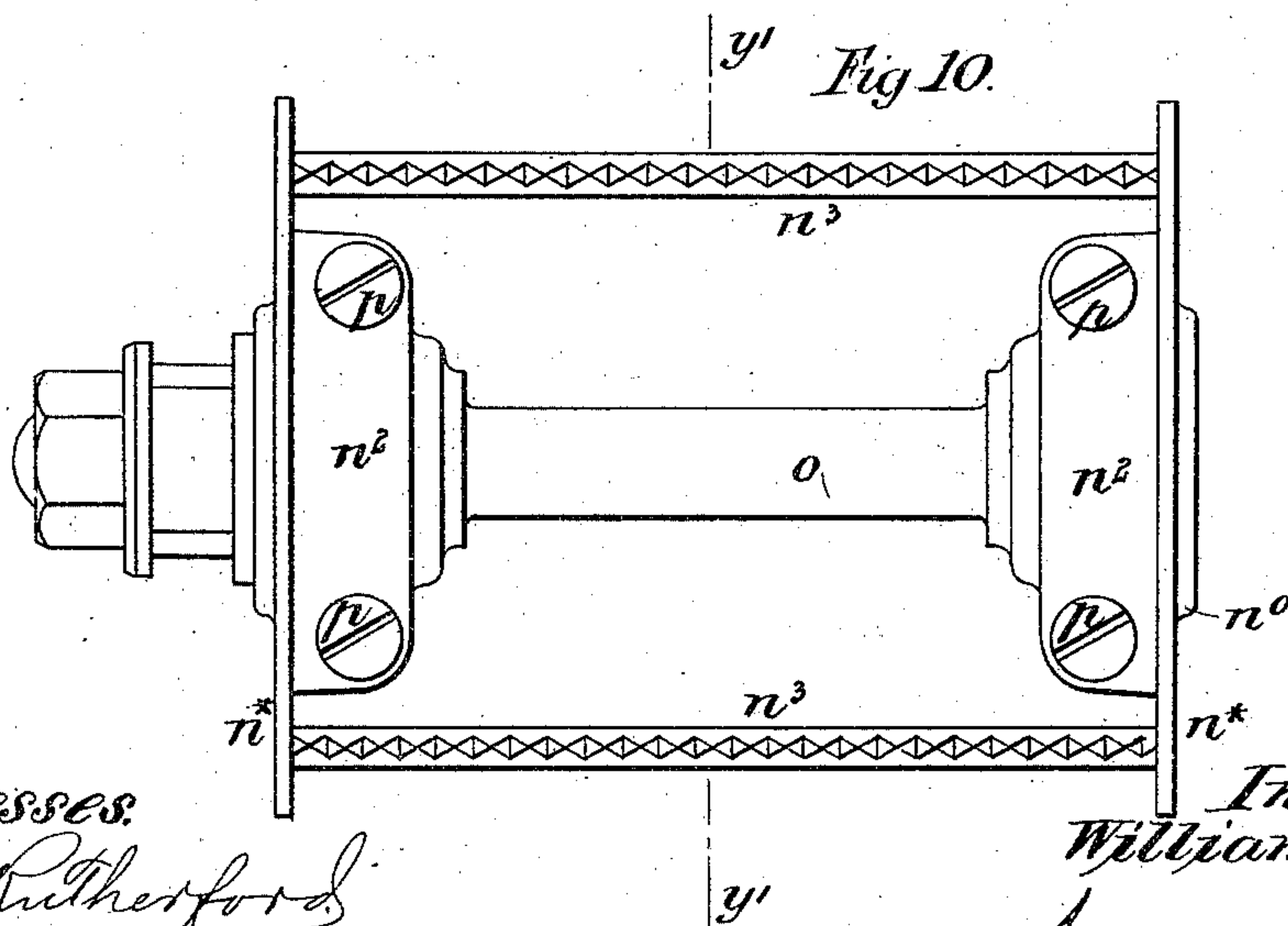
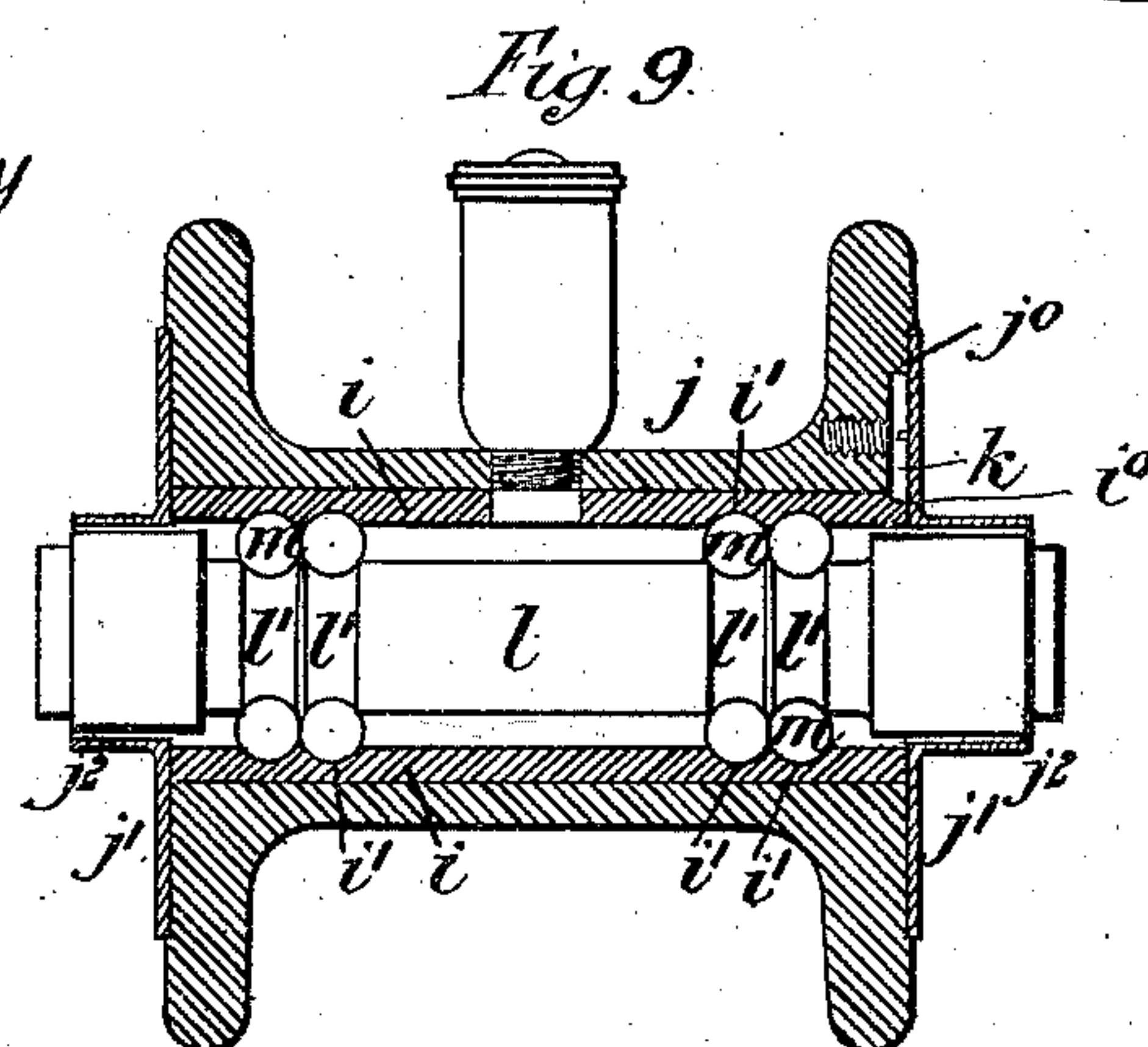
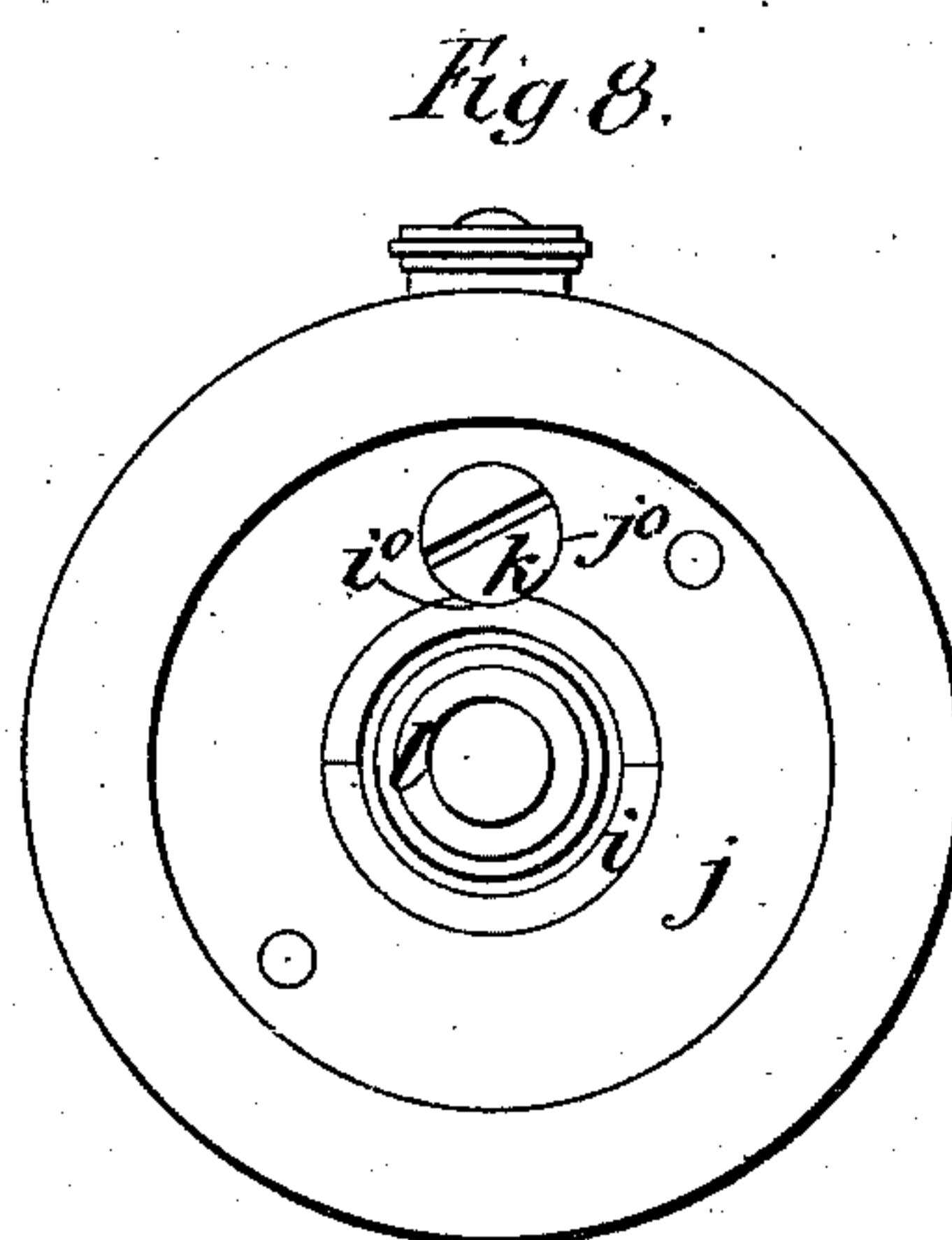
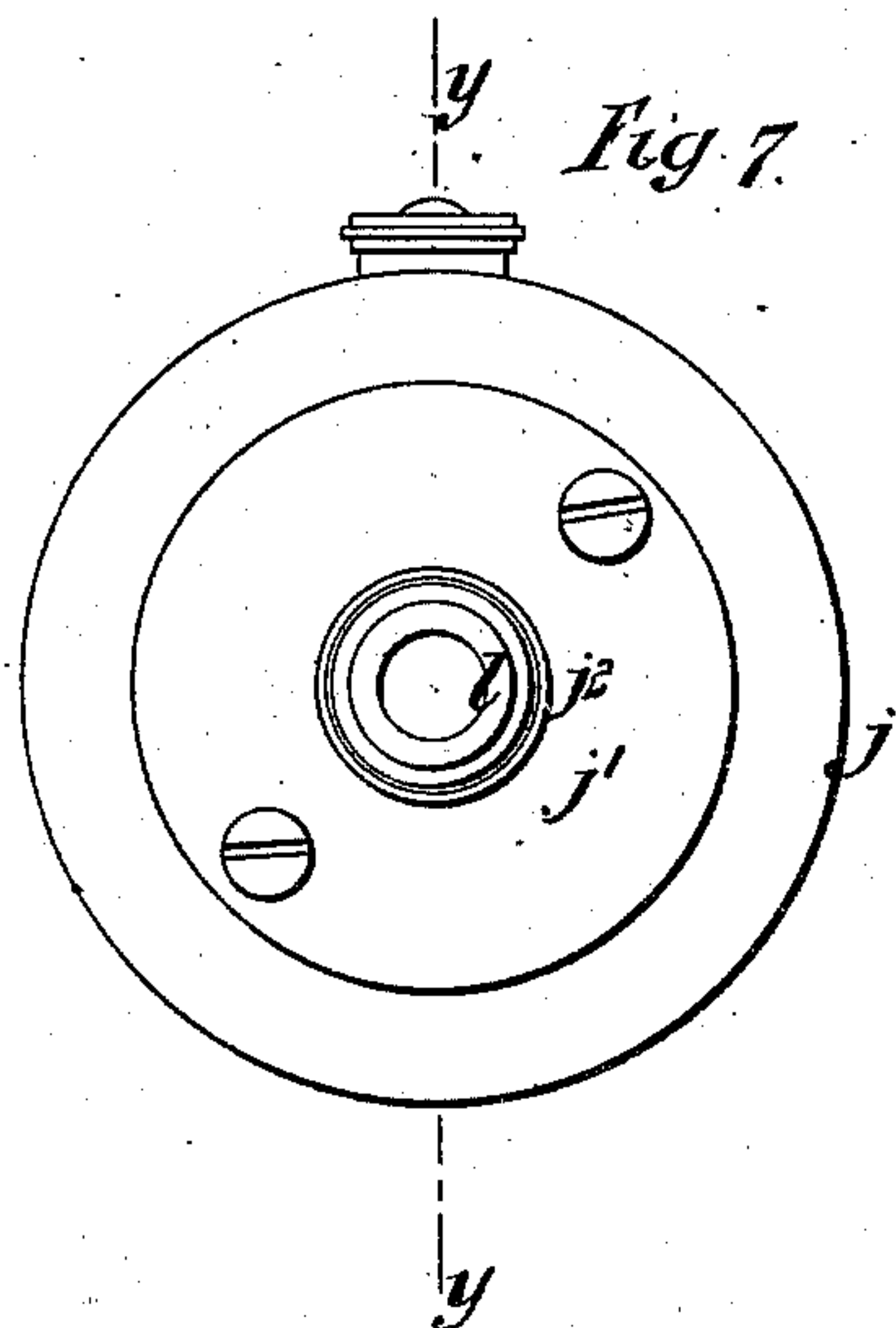
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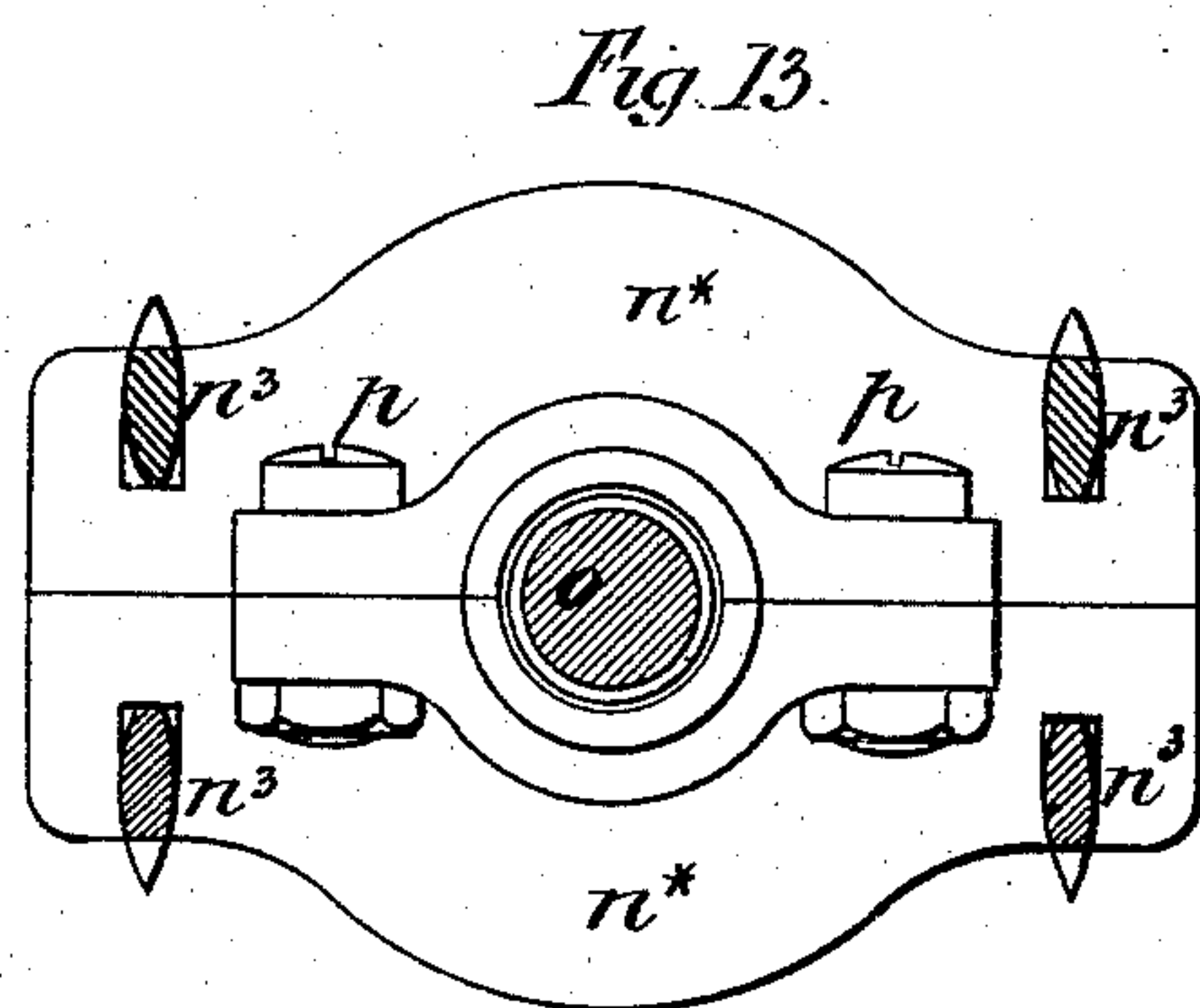
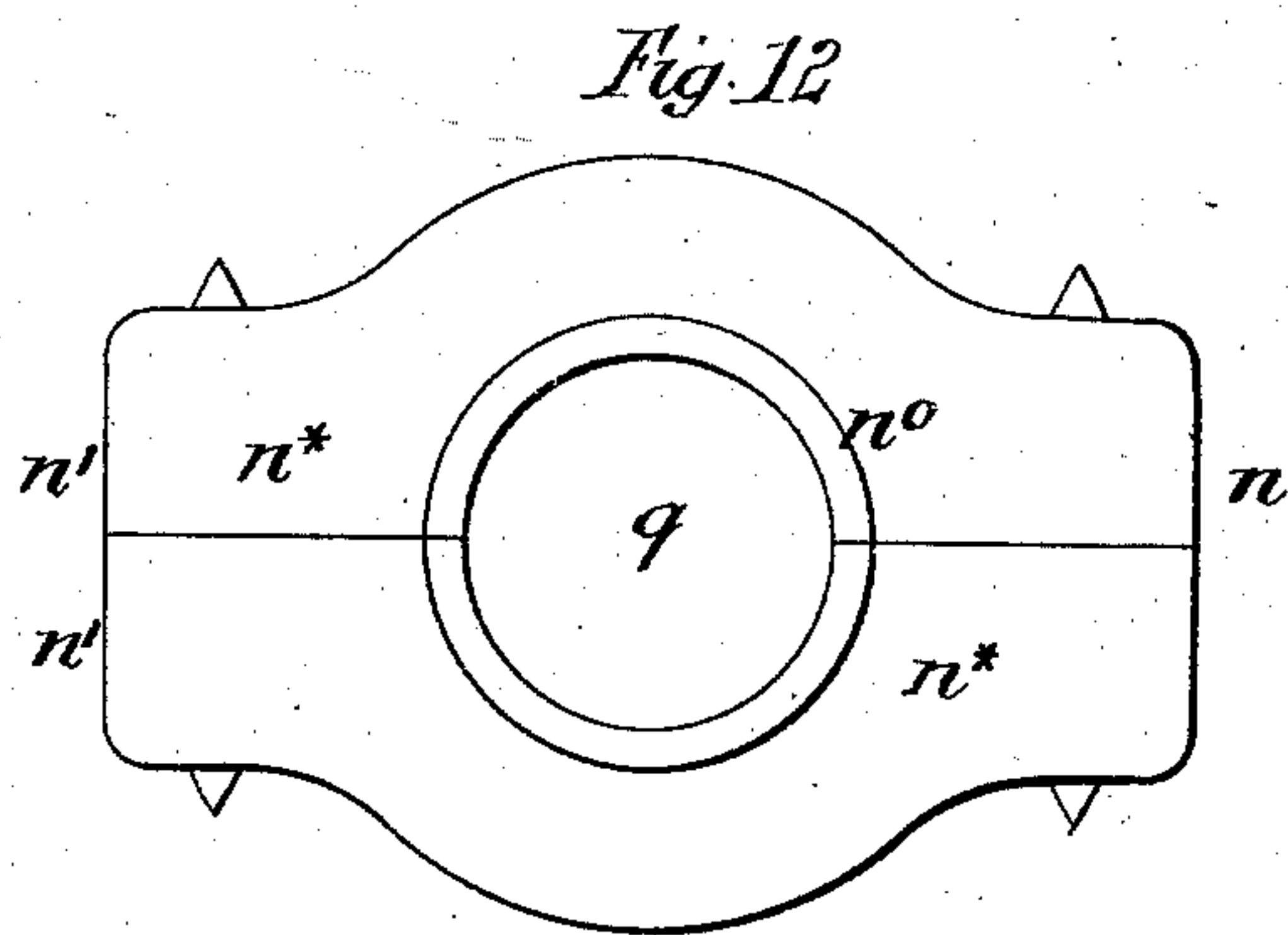
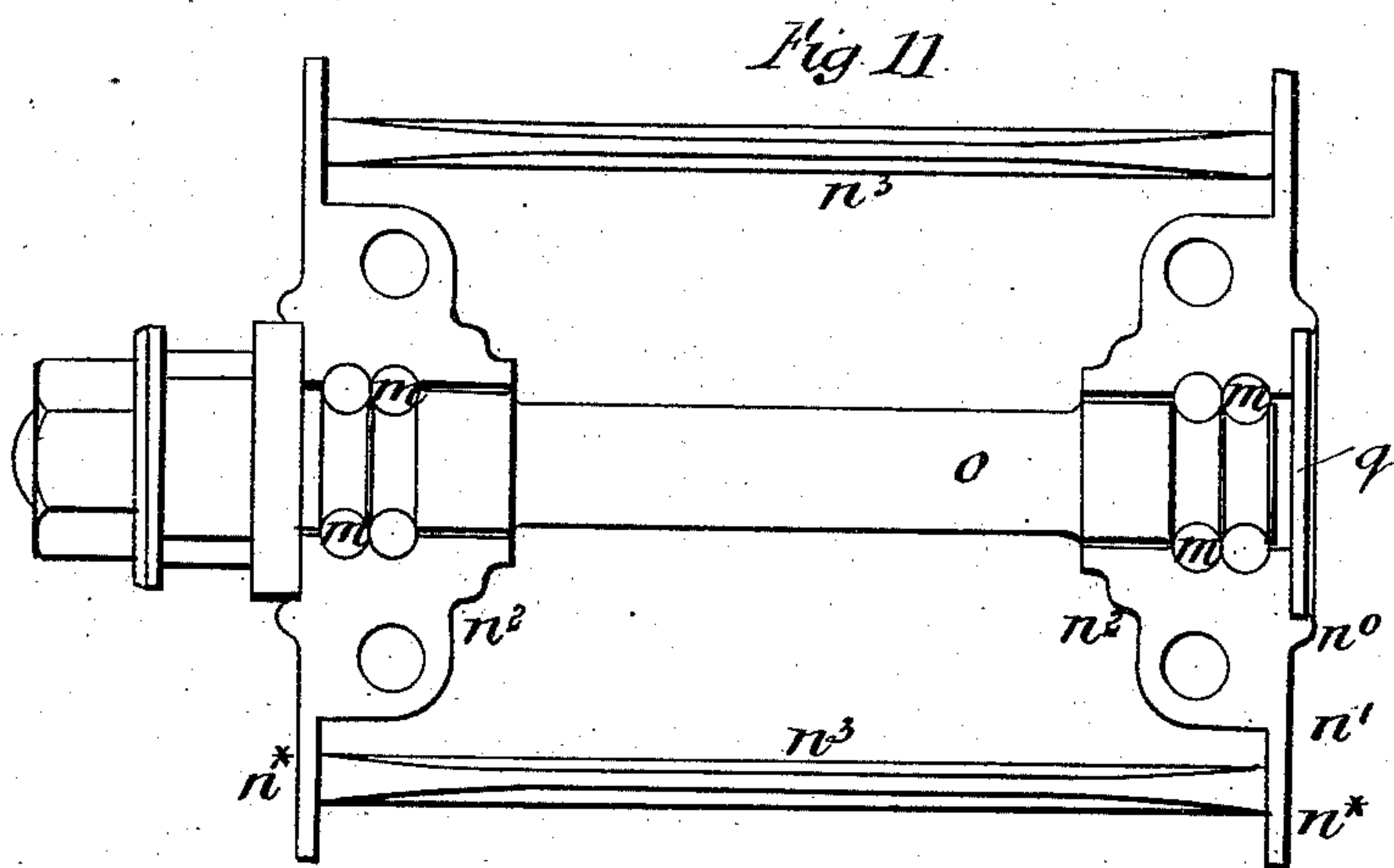
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3 Sheets—Sheet 3.

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Witnesses.

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*Robert Everett*

*Inventor.*  
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# UNITED STATES PATENT OFFICE.

WILLIAM HILLMAN, OF COVENTRY, COUNTY OF WARWICK, ENGLAND.

## VELOCIPEDÉ.

SPECIFICATION forming part of Letters Patent No. 241,361, dated May 10, 1881.

Application filed February 4, 1881. (No model.) Patented in England October 29, 1880.

*To all whom it may concern:*

Be it known that I, WILLIAM HILLMAN, of Coventry, England, have invented new and useful Improvements in Velocipedes, (for which I have obtained a patent in Great Britain, No. 4,432, bearing date October 29, 1880,) of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 illustrates a side view of the spring; Fig. 2, a bottom view of the same; Fig. 3, a transverse section on the line  $xx$  of Fig. 1; Fig. 4, a plan view of the adjustable step; Fig. 5, a side view of the same; Fig. 6, a vertical section on the line  $x'x'$  of Fig. 4; Fig. 7, a side view of the bearings for the wheels; Fig. 8, a similar view with the end plate or washer removed; Fig. 9, a vertical section on the line  $yy$  of Fig. 7; Fig. 10, a plan view of a treadle provided with my improved bearing; Fig. 11, a similar view with part of the treadle removed; Fig. 12, an end view of the treadle; and Fig. 13 is a sectional view on the line  $y'y'$  of Fig. 10.

My invention relates to improvements in velocipedes, and comprises various novel features in the construction of the same, as hereinafter specified.

The said invention consists, partly, in the novel construction of springs for the saddles or seats of velocipedes. This part of my invention is illustrated in Figs. 1 to 3 of the drawings.

My improved spring consists of a top plate,  $a$ , upon which the saddle or seat is mounted, and a bottom plate,  $b$ . These plates are united at their ends preferably by turning the ends  $a'$  of the plate  $a$  over or around the rounded ends  $b'$  of the plate  $b$ , the said ends  $b'$  being provided with pins or studs  $b^2$ , which enter slots or openings  $a^2$ , formed in the ends  $a'$ , to prevent any lateral displacement of the said plates. By the novel construction of the spring and its arrangement upon the backbone in the manner set forth the desired elasticity is obtained without encroaching on the available space above the main wheel of the vehicle. For this purpose the plate  $b$  is provided with a longitudinal slot or aperture,  $c$ , within which the backbone projects—that is to say, the said lower plate,  $b$ , is not placed above or on the top of the backbone, but its two portions  $b^* b^*$  are secured to the lugs  $d'$  of clips  $d$  by means of small screws or bolts  $e$ , passed through the same.

These clips are formed to embrace the backbone and permit the said spring to be readily applied to existing bicycles; or, instead of securing the said plate to lugs formed on the said clips, as above described, the said plate may be attached to lugs formed or fixed on the sides of the backbone, at or below its center. The aforesaid slot or aperture  $c$  is of such a width as to allow the backbone to pass between the two portions  $b^* b^*$ , which, when in position, are below the top of the said backbone, and there is ample space between the latter and the top plate,  $a$ , to allow the required freedom for the action of the spring.

Another part of my invention consists in an improved adjustable step for a bicycle. These vehicles are usually provided with a fixed step; but it is sometimes found desirable to provide them with an adjustable step, instead of or in addition to the fixed step. A difficulty exists with regard to the adjustability of such steps on the backbone by reason of the taper form of the latter, and for this reason, as well as that of their unsightly appearance, none of the devices heretofore employed have been satisfactory; but by my invention I provide a device for this purpose which will be capable of very easy adjustment to any suitable part of the backbone, and which will not present the unsightly appearance of other devices heretofore provided for this purpose. This device is illustrated in Figs. 4 to 6 of the drawings. The said device has a U-shaped piece or strap,  $f$ , designed to embrace or fit around the backbone, and within this piece I arrange a sliding piece,  $g$ , whose upper surface is preferably serrated, as shown, and serves as the step. This piece  $g$  is provided with slots  $g'$ , through which and the piece  $f$  a screw-bolt,  $h$ , is passed, the latter being provided with a nut,  $h'$ , to retain the same in place. In order, however, to clamp the backbone firmly between the pieces  $f$  and  $g$ , I pass through a tapped hole in the bolt  $h$  a screw,  $h^2$ , which, when screwed up, will exert sufficient force upon the part  $g$  to clamp the same firmly upon the backbone, the said screw being provided with a lock-nut,  $h^3$ , to retain the said part  $g$  in position when so clamped.

Instead of employing the screw  $h^2$ , I in some cases use an eccentric or equivalent device for effecting the clamping of the part  $g$  upon the



backbone. The slots  $g'$  permit the said piece  $g$  to be moved inward or outward within the said piece  $f$ , or according to the position it is to be fixed in and to suit the varying diameter of the backbone consequent upon its taper form.

My invention further consists in improvements in the construction of ball-bearings for the wheels and pedals of velocipedes. This part of my invention is illustrated in Figs. 7 to 13 of the drawings.

In applying my improved ball-bearing to a wheel, I employ a bush,  $i$ , divided longitudinally into two halves, as shown in Fig. 8, and insert the same within the boss or hub  $j$  of the wheel. The said bush is secured within the boss  $j$  by a screw,  $k$ , at each end of the latter. The head of each screw enters a countersunk aperture or recess,  $j^0$ , formed in the face of the boss, and also a recess,  $i^0$ , in the bush  $i$ , and thus serves as a stop to prevent any end-wise movement of the said bush. Or other suitable means for keeping the bush in place in the hub may be employed, the said bush being fitted upon the spindle shaft or journal  $l$  of the wheel in the usual manner. The aforesaid two halves of the bush  $i$  are provided with grooves or channels  $i'$ , extending around their interior surface, and the journal or shaft  $l$  is also provided with similar grooves,  $l'$ . These grooves serve for the retention of the balls or spherical rollers  $m$ . I prefer to employ four of such grooves and series of rollers. To effectually exclude dust from such bearings, thereby greatly increasing their durability and facilitating the working of the vehicle, I provide the hub or boss with end plates or washers,  $j' j'$ . The faces of the said hub or boss are recessed for the reception of these plates, which may be formed of brass or other metal, and have a short external neck or projection,  $j^2$ , which fits the spindle  $l$ . These washers are preferably secured upon the faces of the hub or boss by means of small screws, and when properly fixed in position form very efficient protection against the entrance of dust into the bearing. When this device is applied to the small wheel of a bicycle I prefer to recess the inside of the boss of the fork, to receive and inclose the projections  $j^2$  on the said washer, and thus further insure the exclusion of dust.

In applying my improved ball-bearings to the pedal, as shown in Figs. 10, 11, 12, and 13, I make the pedal  $n$  in two halves, as shown at  $n' n'$ . Each half consists of two ends,  $n^2 n^2$ , which inclose the balls or rollers  $m$ , and which are united by two bars,  $n^3 n^3$ , whereon the feet of the rider rest. These bars are either serrated, as shown, or covered with india-rubber. Each end consists of a flat plate,  $n^*$ , and on

these plates I form the parts  $n^2$ , that inclose the said balls or rollers. I prefer to use two series of rollers in each end. The top and bottom halves,  $n' n'$ , are secured together around the shaft or journal  $o$  of the pedal, preferably by small screw-bolts  $p$  passed through the parts  $n^2$  and provided with nuts, as shown. I provide means for the exclusion of dust from these bearings by the employment of end plates or washers, as follows: On the exterior or outer surface of the end pieces,  $n^2$ , I provide an undercut or recessed rim or flange,  $n^0$ , which, when the two halves  $n' n'$  are united, forms a complete circle, equally divided by the said halves, as shown in Fig. 12. Within the recess in the end plate of the bearing I insert a circular plate or disk,  $q$ , of thin steel or other metal, which, when the two parts  $n' n'$  are properly fitted together, will enter the recess in the end plate of the other part of the bearing, and will thus form a perfectly-tight dust-excluding cover to the same without necessitating the use of screws or similar fastenings.

What I claim is—

1. A spring consisting of the upper plate,  $a$ , and the lower slotted plate,  $b$ , adapted to be secured to the lugs upon the clips  $d$ , embracing the backbone, or to lugs upon the backbone itself, substantially as above set forth, and for the purposes specified.

2. An adjustable step for bicycles, consisting of the strap or piece  $f$ , the slotted piece  $g$ , and the screw-bolts and nuts  $h h' h^2 h^3$ , or the equivalent thereof, substantially as above set forth.

3. The combination, with a wheel-hub, of an interior bush divided longitudinally into two separate semi-cylindrical halves, and provided near the opposite ends with annular grooves  $i'$ , the shaft or journal  $l$ , formed in its periphery with grooves  $l'$ , the two sets of spherical balls,  $m$ , arranged, respectively, in the grooves of the bush and shaft or journal, and the end plates,  $j'$ , fitted upon the latter and covering the ends of the bush, substantially as described.

4. For a velocipede-pedal, a ball or roller bearing constructed in two halves,  $n' n'$ , consisting of the ends  $n^2 n^2$ , united by the cross-bars  $n^3 n^3$ , which ends inclose the balls or rollers  $m$ , surrounding the journal  $o$ , substantially as set forth.

5. The bearing for velocipede-pedals having the exterior of their ends  $n^2$  provided with the rim or flange  $n^0$ , in combination with the plate or disk  $q$ , seated within said rim or flange, as and for the purposes herein described.

WILLIAM HILLMAN.

Witnesses:

S. H. NORTON,  
W. H. HERBERT.