

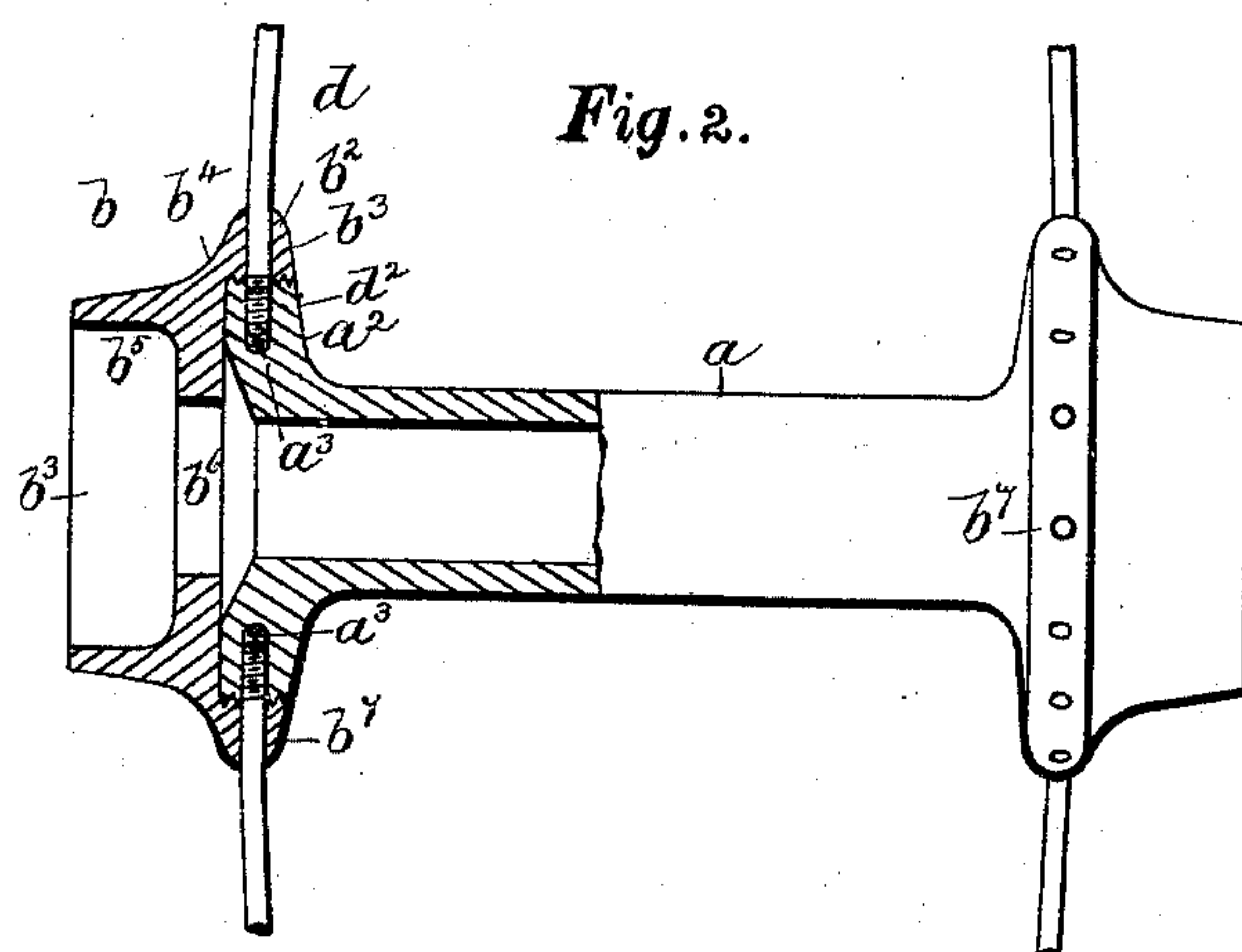
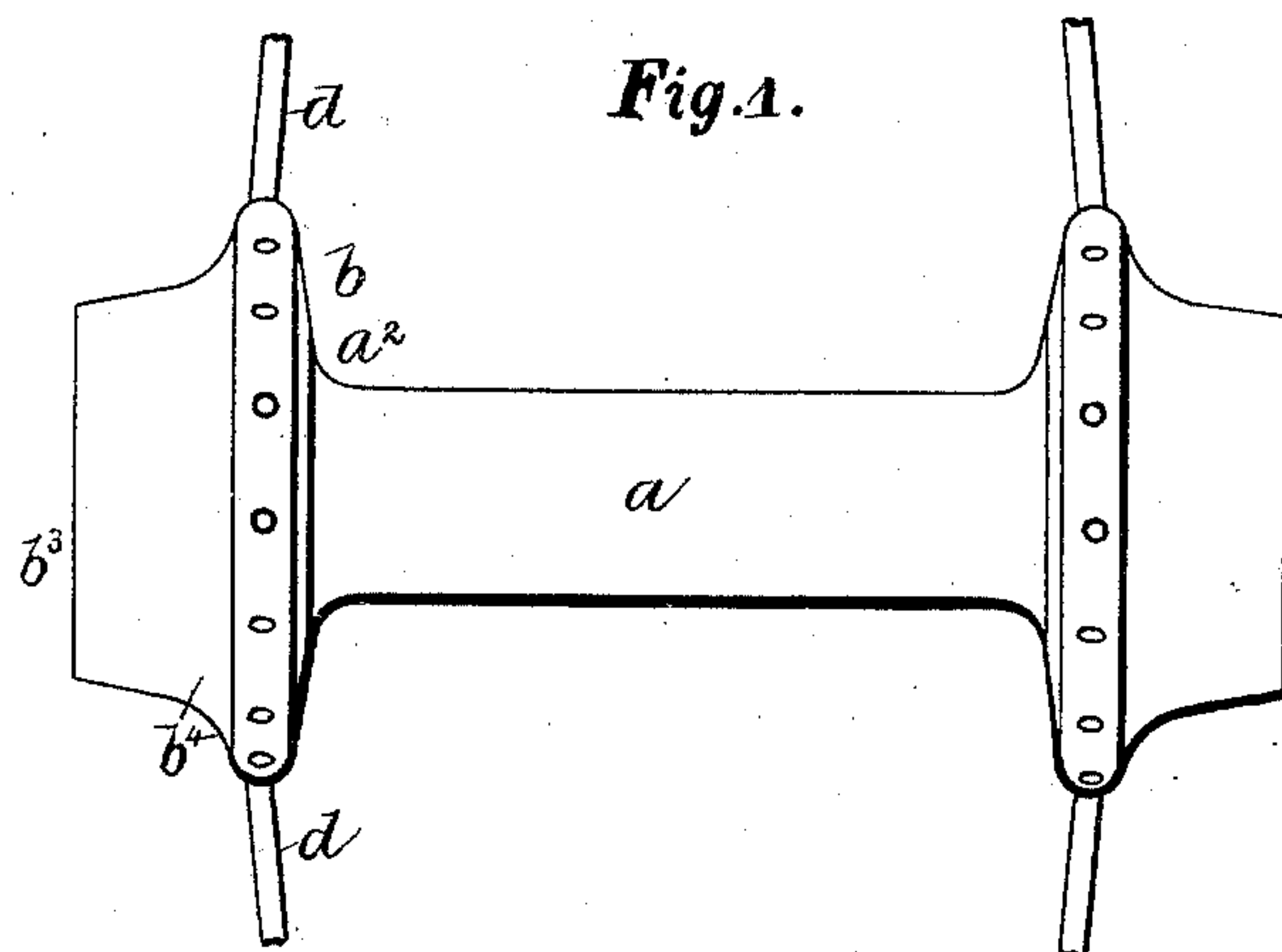
(No Model.)

3 Sheets—Sheet 1.

R. GREEN.  
HUB.

No. 473,837.

Patented Apr. 26, 1892.



**WITNESSES**

WITNESSES  
Henry Cherrett  
Arthur Sadler.

INVENTOR

Richard Green  
by Connolly Bros. Attys

(No Model.)

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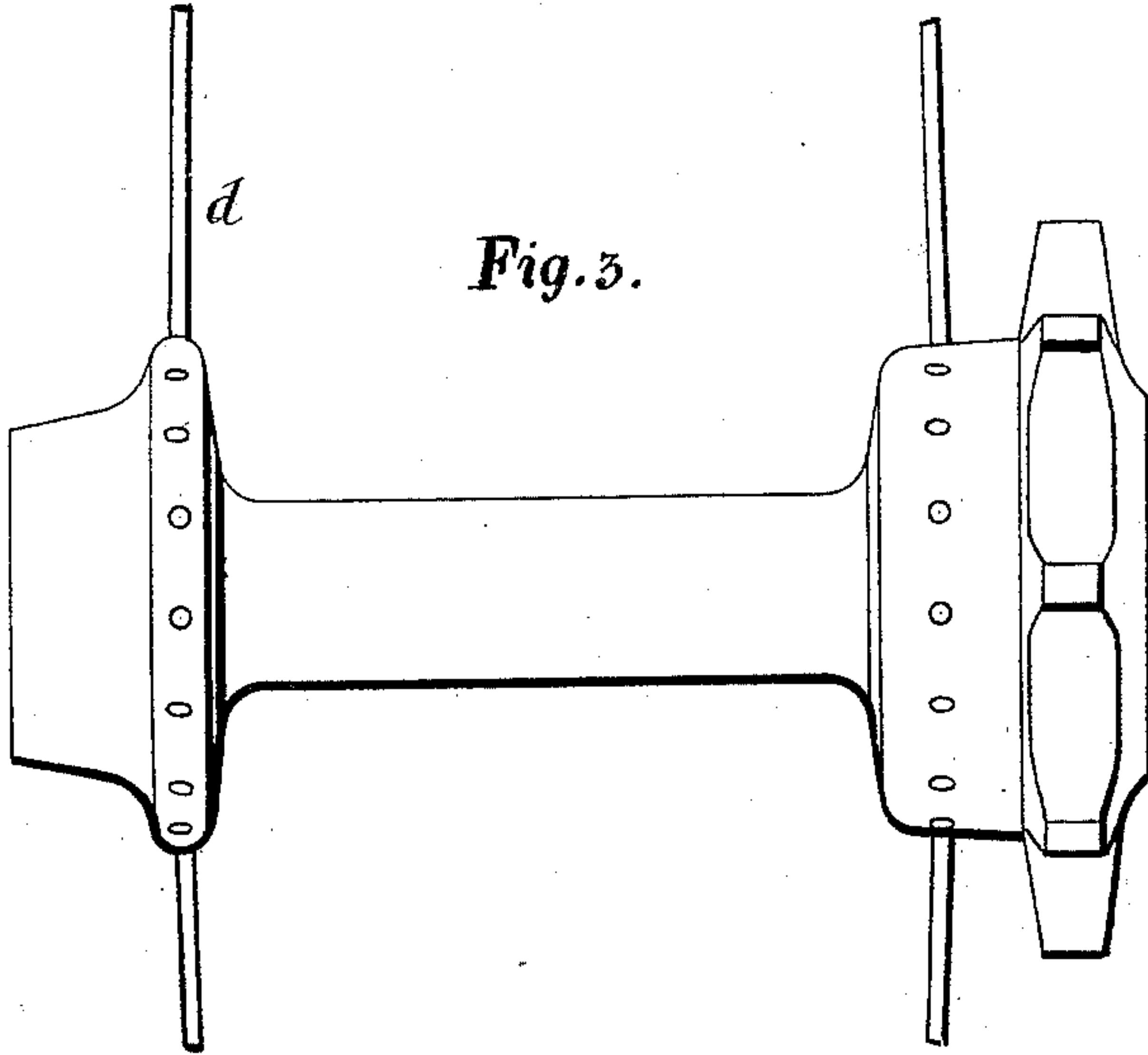


Fig. 3.

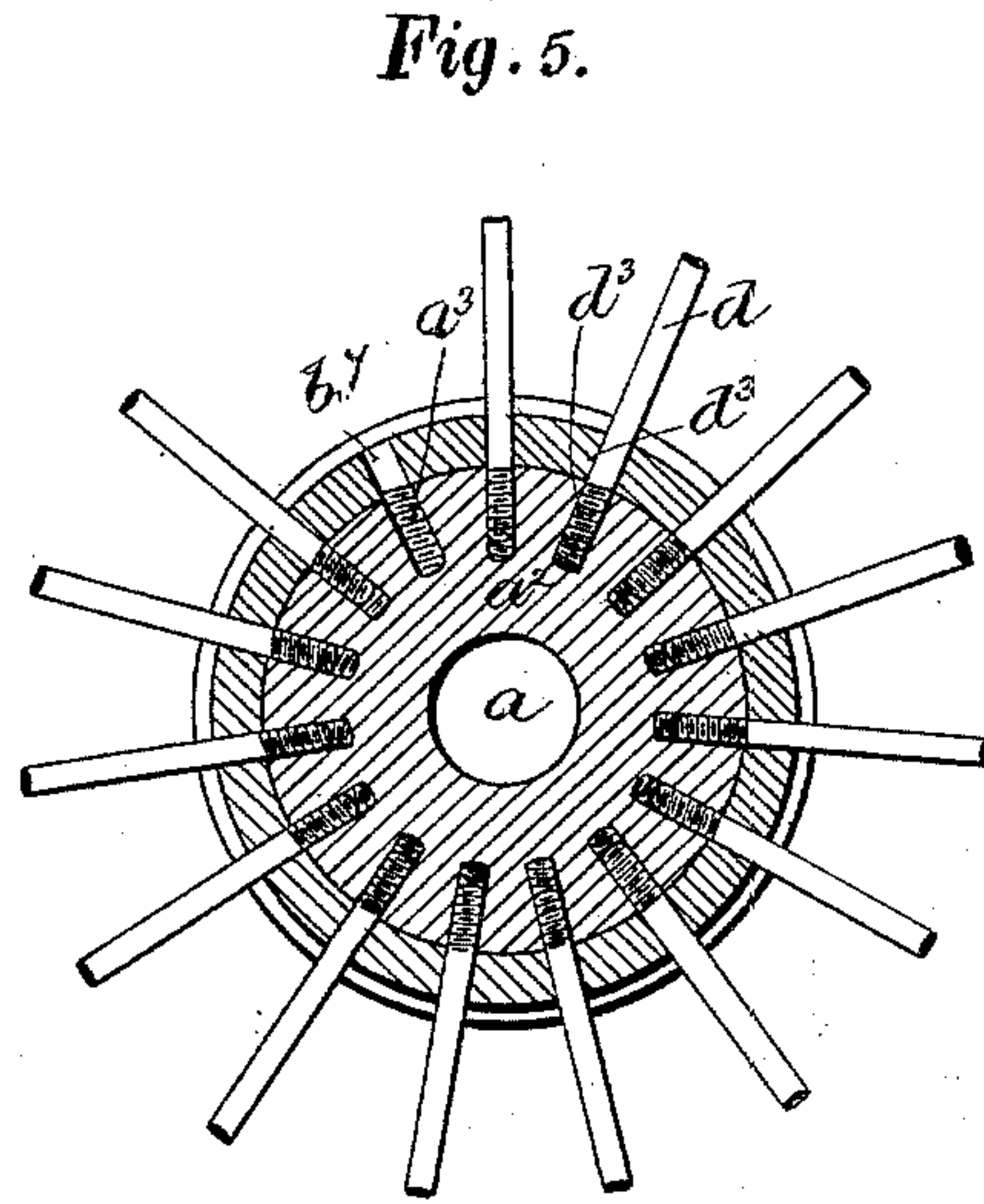


Fig. 5.

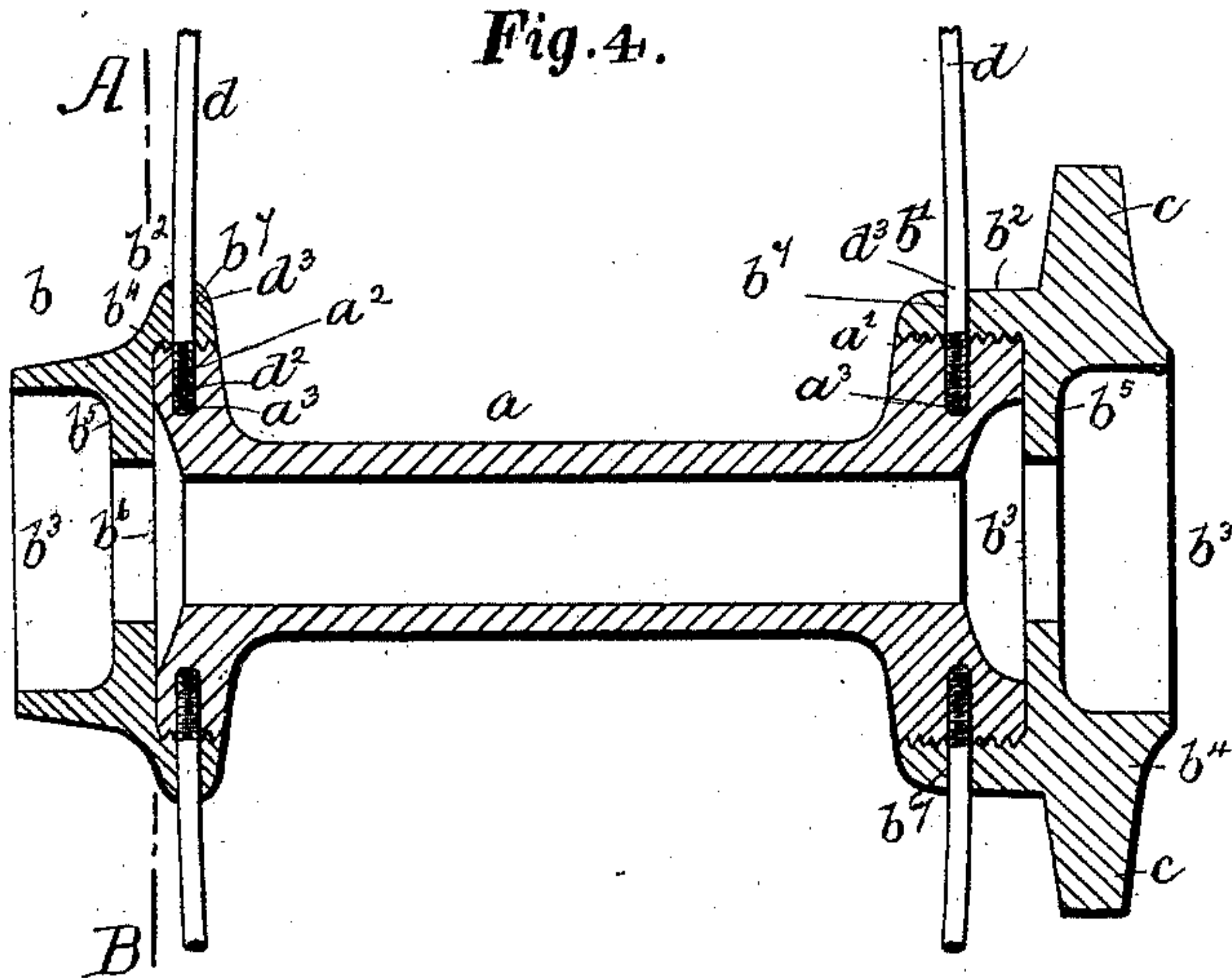


Fig. 4.

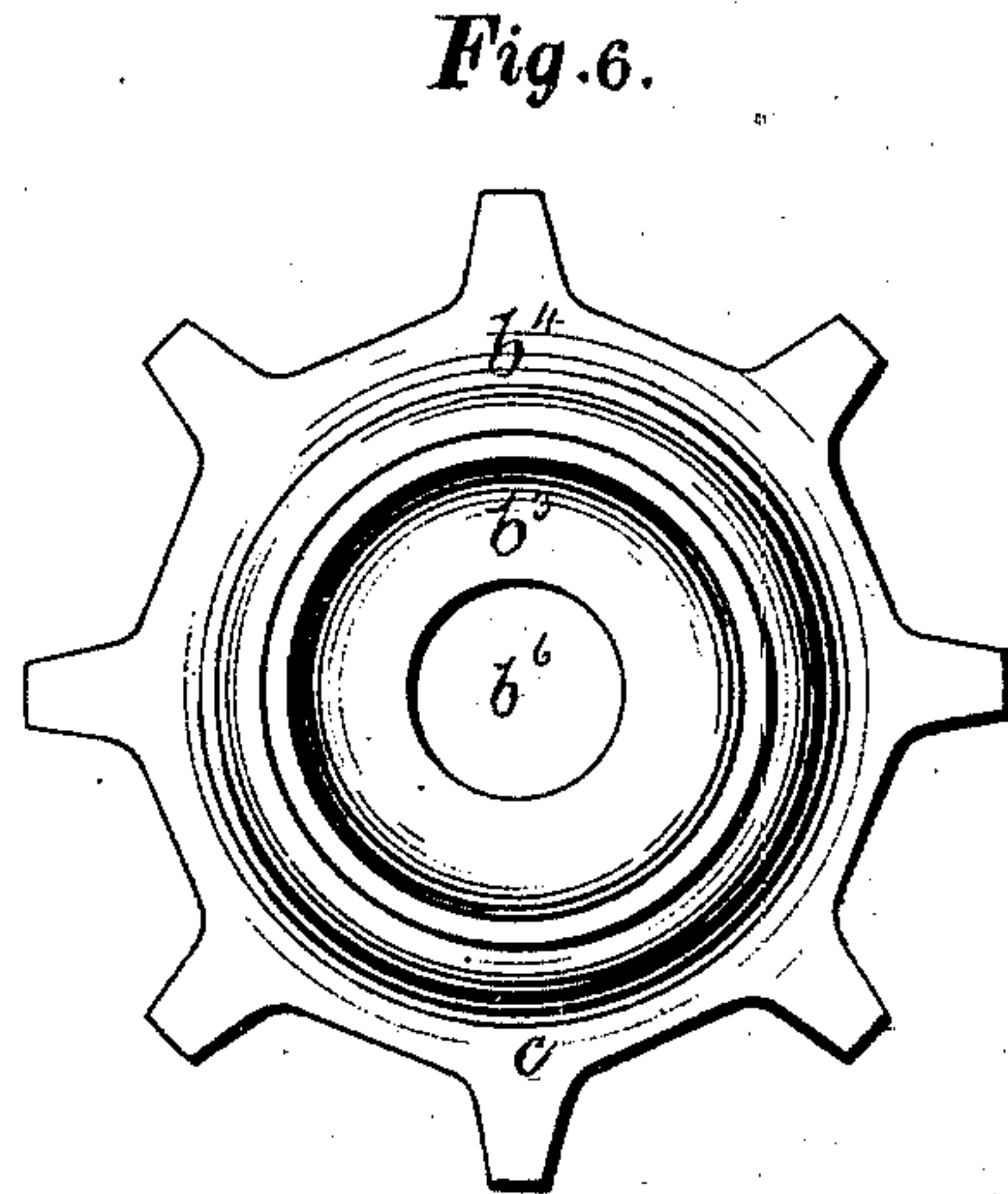


Fig. 6.

WITNESSES

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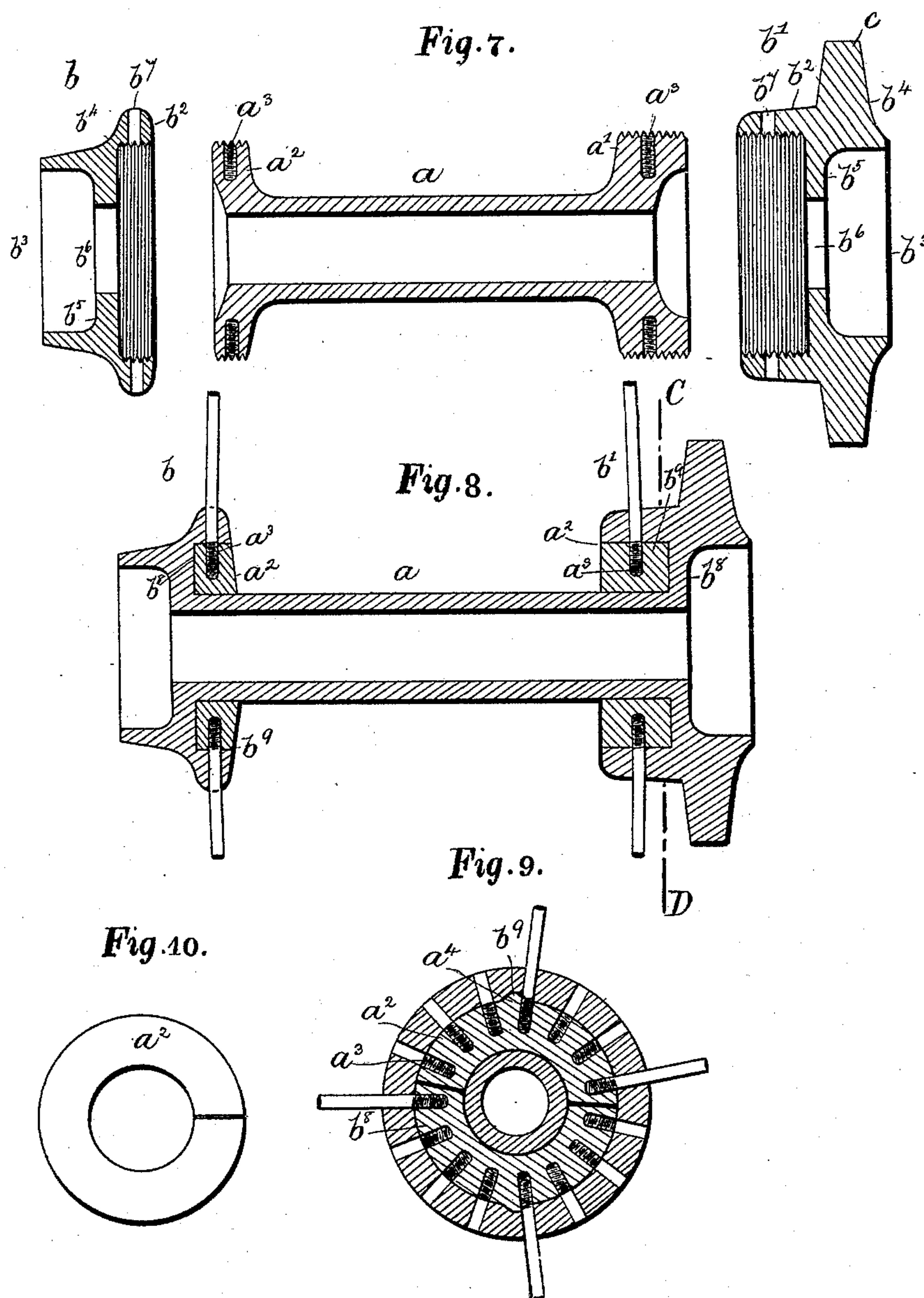
(No Model.)

3 Sheets—Sheet 3.

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Patented Apr. 26, 1892.



WITNESSES

Henry Charneth  
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# UNITED STATES PATENT OFFICE.

RICHARD GREEN, OF BIRMINGHAM, ENGLAND.

## HUB.

SPECIFICATION forming part of Letters Patent No. 473,837, dated April 26, 1892.

Application filed November 23, 1891. Serial No. 412,837. (No model.) Patented in England September 5, 1891, No. 15,001.

*To all whom it may concern:*

Be it known that I, RICHARD GREEN, manufacturer, a subject of the Queen of Great Britain, residing at Broad Street, in the city of Birmingham, England, have invented certain new and useful Improvements in Hubs or Wheel-Centers, (for which I have obtained Letters Patent in England, dated September 5, 1891, No. 15,001;) and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification.

This invention relates to hubs or wheel-centers for velocipedes and other like wheeled vehicles.

Figure 1 of the accompanying drawings represents in elevation a hub or wheel-center constructed or made up according to my invention. Fig. 2 represents a longitudinal section of the same. Fig. 3 is a side view of a "Safety" cycle back-wheel hub or a combined wheel center and chain-wheel constructed according to my invention. Fig. 4 is a longitudinal section of the same, and Fig. 5 is a cross-section on dotted line A B of Fig. 4. Fig. 6 is an end view of the chain-wheel. Fig. 7 is a sectional view showing the waist, head, and chain-wheel detached. Fig. 8 is a longitudinal sectional view of a modified form of wheel-center. Fig. 9 is a transverse section of the same. Fig. 10 is a face view of the split bush.

Referring now to Figs. 1 and 2, *a* is a gun-metal waist or hollow middle part with annular flanged ends *a*<sup>2</sup>, which form, as it were, inner cores of soft metal wherein the wormed ends of the spokes take. *b* are heads or end caps, of hardened steel, and each of which comprehends an annular rim *b*<sup>2</sup>, which is internally screwed and takes upon the flanges *a*<sup>2</sup> a bearing-cup or ball-race *b*<sup>3</sup>, a body part *b*<sup>4</sup>, and a back wall *b*<sup>5</sup>, with a spindle-hole *b*<sup>6</sup> made through it and coming coincident or linable with the middle of the waist. *b*<sup>7</sup> are plain holes made through the steel of the flanges *b*<sup>2</sup>, and *a*<sup>3</sup> are tapped holes made in the rims or flanges of the soft-metal waist or middle part *a*. *d* are the spokes, whose screwed inner ends *d*<sup>2</sup> take into the tapped holes *a*<sup>3</sup>, and with the shanks and plain adjacent metal parts *d*<sup>3</sup> of the said inner ends

taking through the plain holes *b*<sup>7</sup> in the steel rim *b*<sup>2</sup>.

Referring now to Figs. 3, 4, 5, 6, and 7, *a* is a gun-metal waist or hollow bearing middle part, with annular flanges *a*<sup>2</sup> directed from the terminal ends of the same, and which form, as it were, inner cores of soft metal, wherein the wormed ends of the spokes take, and upon which the heads or head ends *b* *b*<sup>7</sup> come. The head *b* at one end of the wheel-center consists of an annular flange *b*<sup>2</sup>, bearing-cup or ball-race *b*<sup>3</sup>, body *b*<sup>4</sup>, back wall *b*<sup>5</sup>, with spindle-hole *b*<sup>6</sup> made through it, and coming coincident or linable with the hollow waist. In the end *b*<sup>7</sup> *b*<sup>2</sup> is an annular collar, internally screwed and taking upon the externally-screwed bossed end *a*<sup>7</sup> of the neck *a* and with the spokes *d*, taking through the plain holes *d*<sup>7</sup> of the said rim and screwing into the tapped holes *a*<sup>3</sup>, made in the soft-metal flange *a*<sup>7</sup>. *c* is a chain-wheel, formed in one piece with the said arm *b*<sup>7</sup>, and a bearing-cup or ball-race *b*<sup>3</sup> and parts *b*<sup>4</sup>, *b*<sup>5</sup>, and *b*<sup>6</sup>, alike unto the other end.

In the modification shown in Fig. 8 the waist and head ends, combining with them the chain-wheel and cup-bearings, are made solid or in one piece and of hardened steel, with a soft-metal or gun-metal bush fitted into the backs or inside parts of the said heads, and which said bushes are tapped, and wherein the screwed ends of the spokes take. *a* is the waist, *b* one end or head, and *b*<sup>7</sup> the other end, made solid or in one piece and of hardened steel with the waist *a*, and which ends have sunken within their back or inner sides recesses *b*<sup>8</sup>, wherein soft-metal segmental bushes *a*<sup>2</sup> with tapped holes *a*<sup>3</sup> are fitted, so that the shanks of the inner ends of the spokes next to the wormed extreme ends pass through plain holes in the hard metal, and with their screwed ends taking within the soft-metal bushes or rings *a*<sup>2</sup>, which are prevented from rotating within their recesses by ribs *a*<sup>4</sup>, taking into grooves *b*<sup>9</sup>, formed within the outer circumferences of the recesses *b*<sup>8</sup>.

Fig. 10 represents a split bush only, instead of a segmental one, as in Figs. 8 and 9.

Having now described my invention, what I claim is—

1. In a hub or wheel-center, the combination of a waist portion  $a$ , having enlarged ends  $a'$   $a^2$ , with the heads  $b$ , having annular flanges  $b^2$ , fitting over said enlarged ends and  
5 pierced for the passage of spokes, substantially as described.
2. In a hub or wheel-center, the combination, with heads  $b$ , having annular flanges  $b^2$ , surrounding a soft-metal bushing, of spokes  
10 passing through unthreaded holes in the said flanges and into threaded holes in the bushing, substantially as described.
3. The combination, with the heads of a wheel-center and inner screwed ends of spokes, of tapped holes  $a^3$ , made within soft-metal  
15 parts, and plain holes  $b^7$ , made through the outer casing of the head, substantially as described and set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of 20 October, 1891.

RICHARD GREEN. [L. s.]

Witnesses:

HENRY SKERRETT,

ARTHUR SADLER,

*Both of Birmingham.*