

No. 641,366.

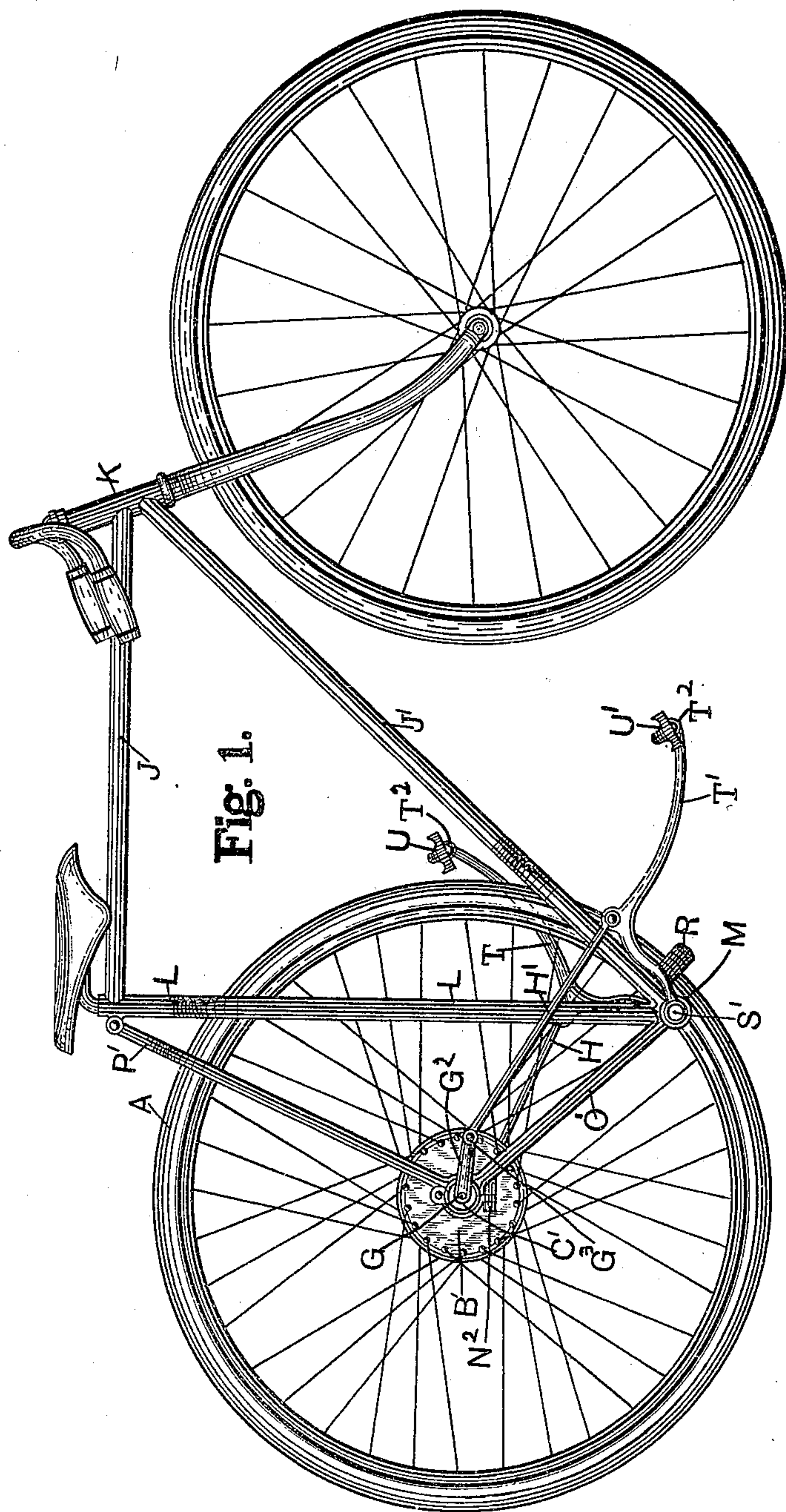
Patented Jan. 16, 1900.

J. F. BRADY.
BICYCLE.

(Application filed Sept. 8, 1898.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES:

W. H. Stiles
H. A. Bowers

INVENTOR:

John F. Brady
By his atty Oscar Snell

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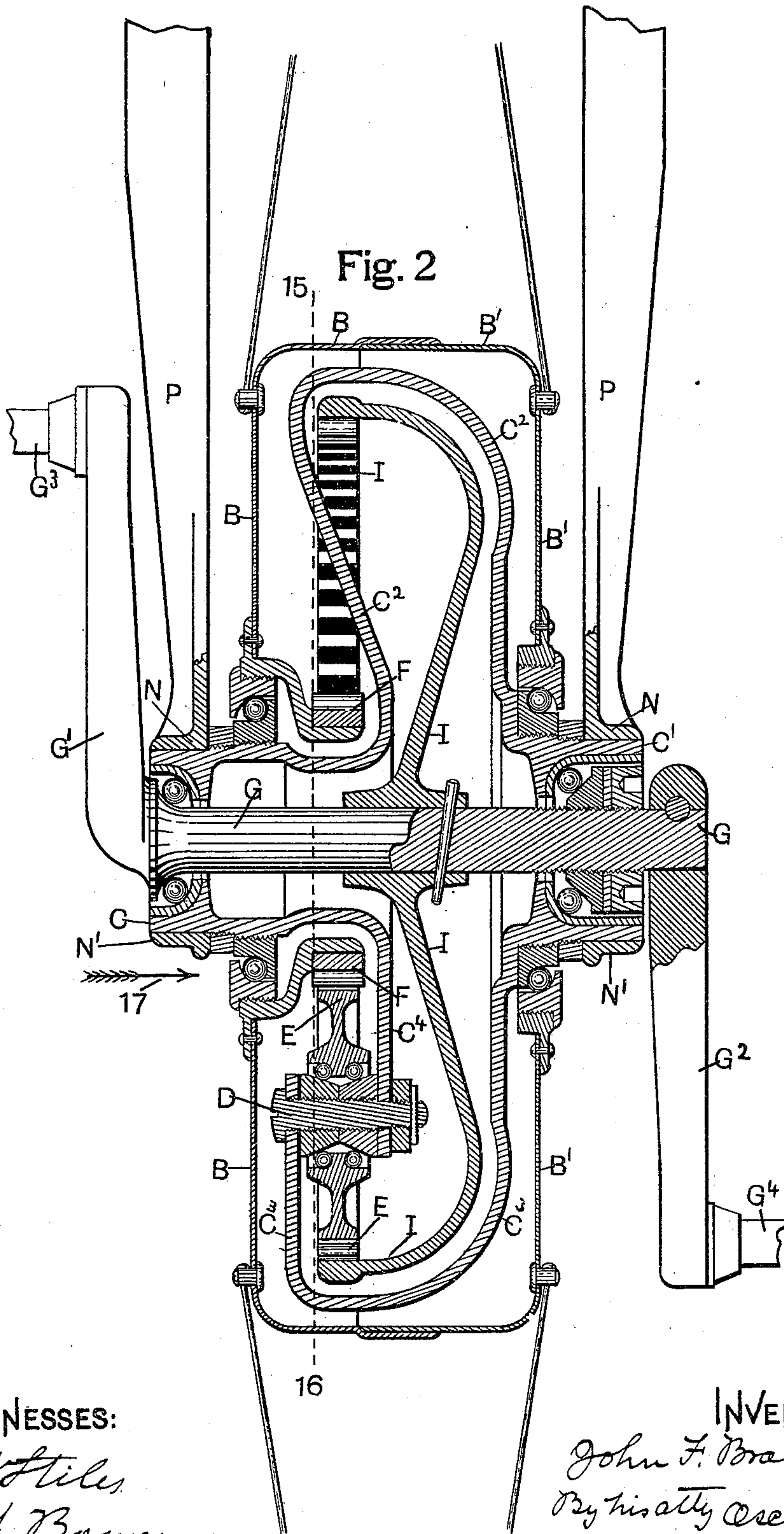
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By his atty *Oscar Snell*

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4 Sheets—Sheet 3.

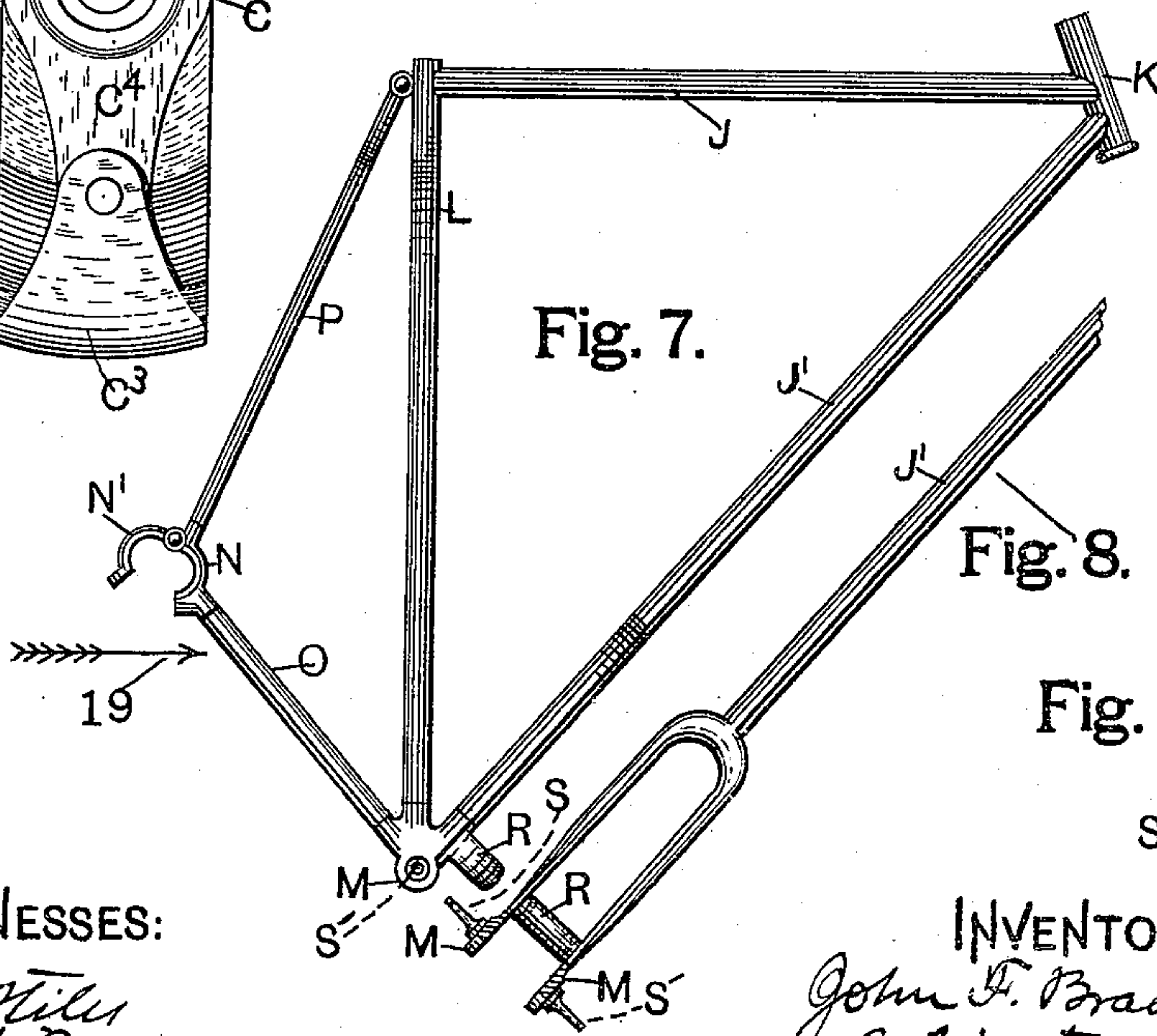
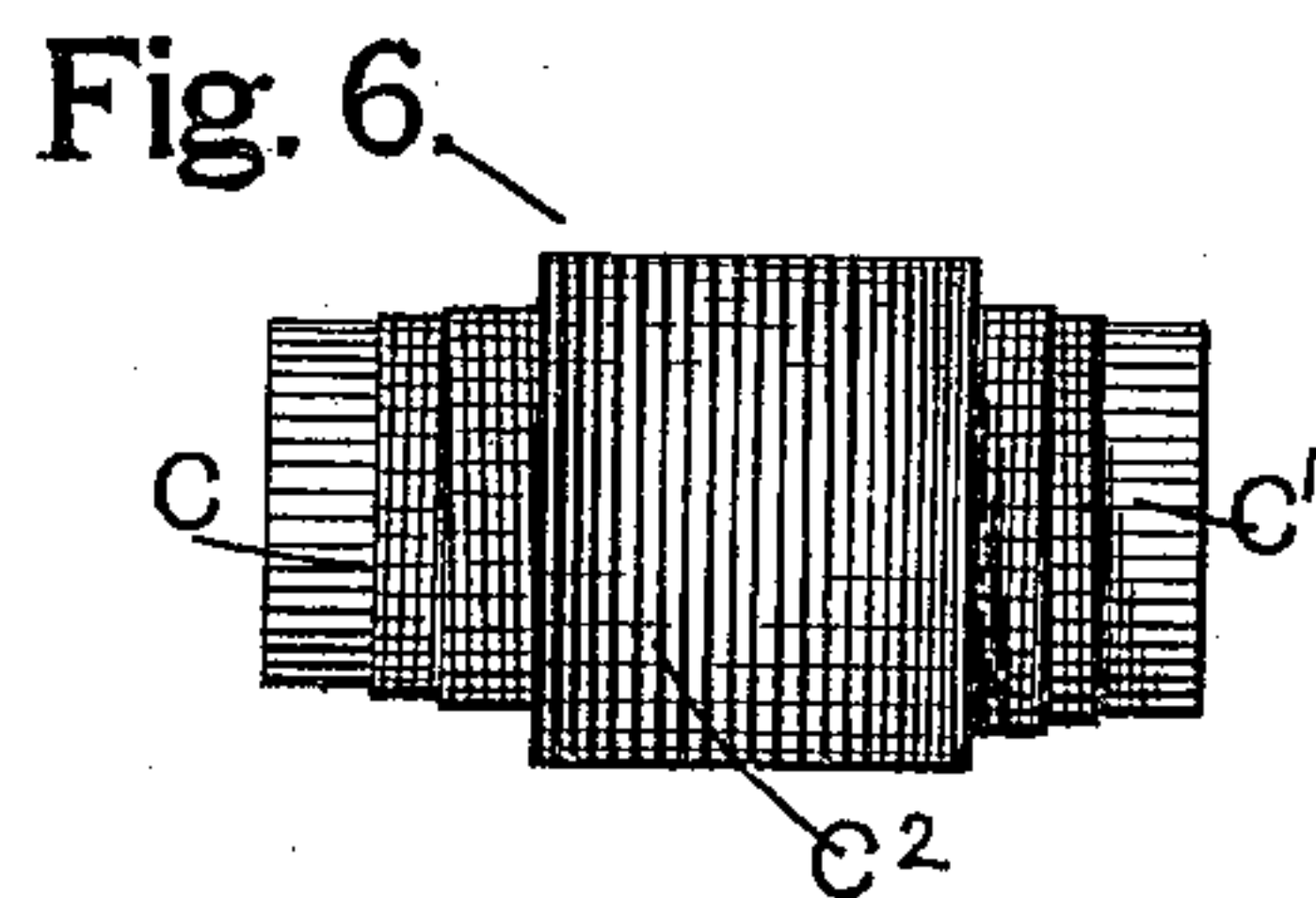
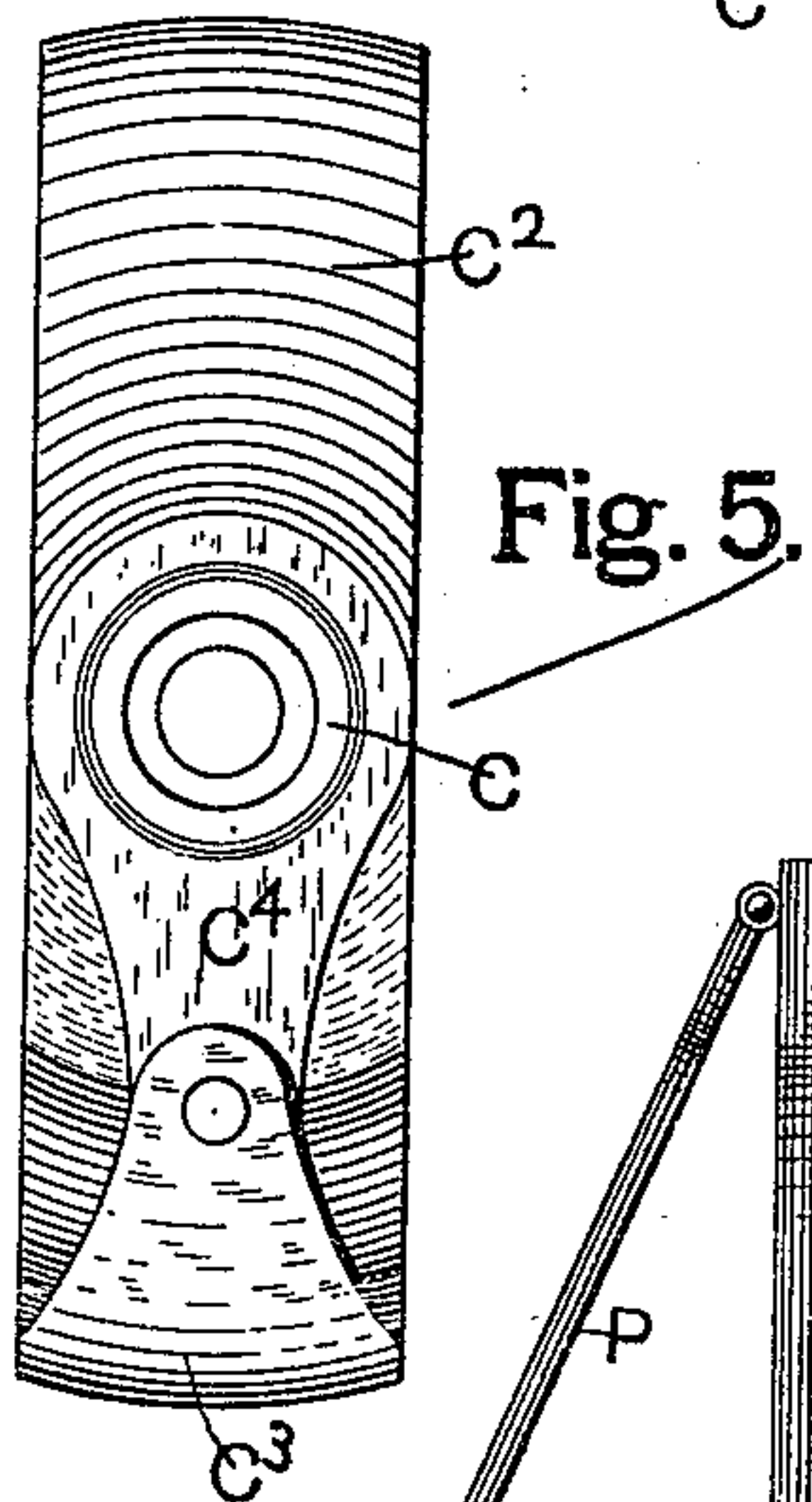
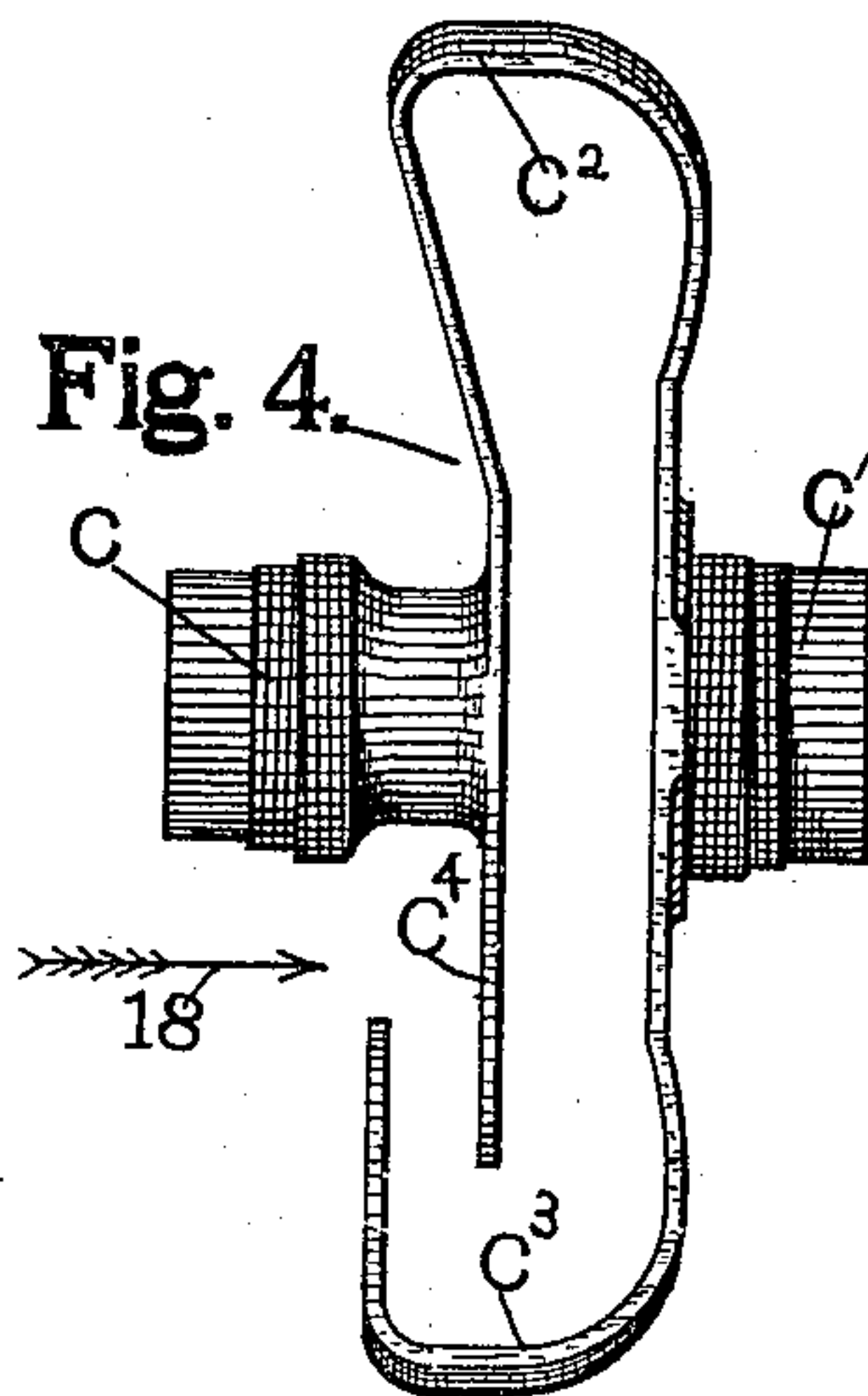
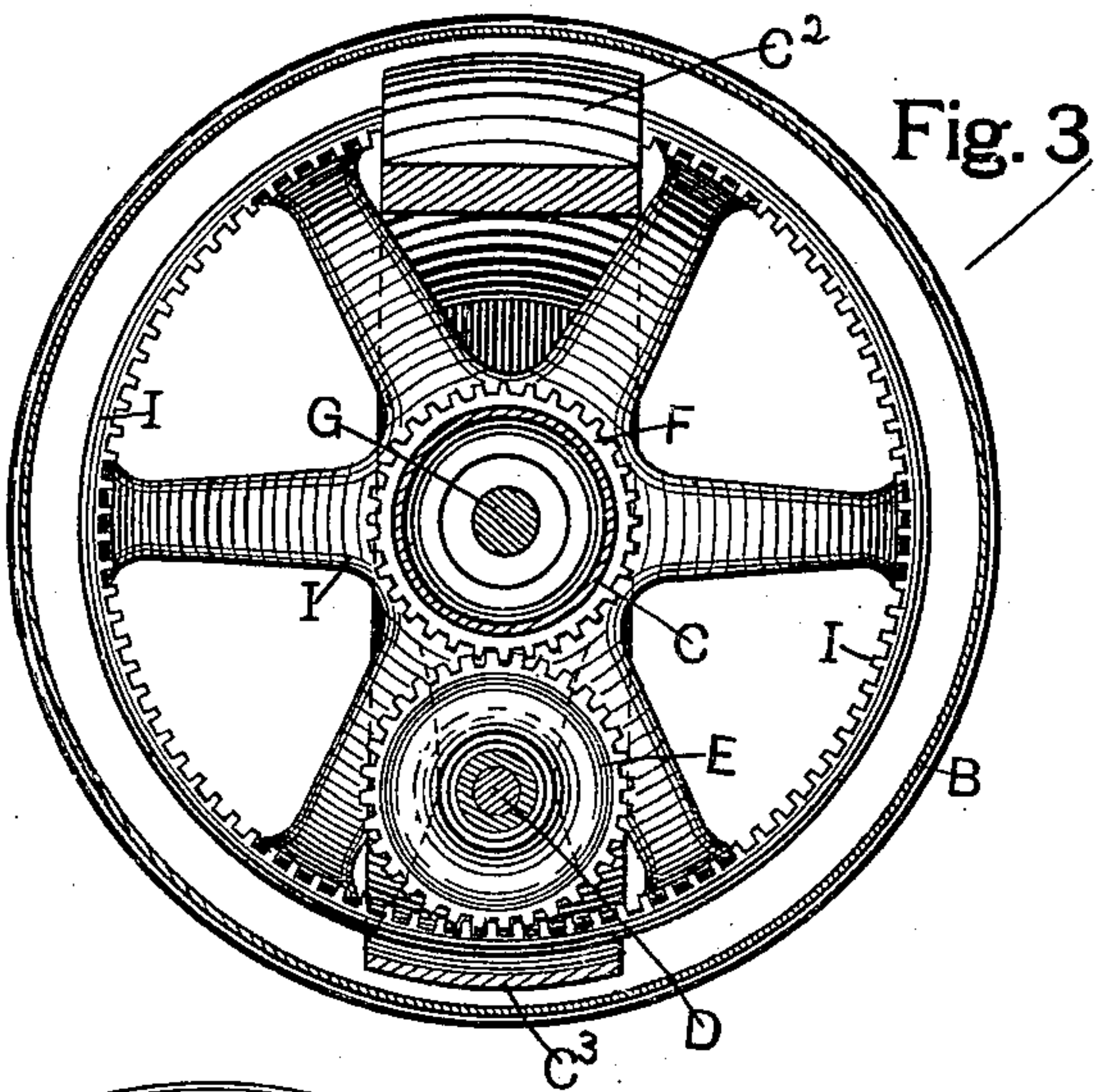
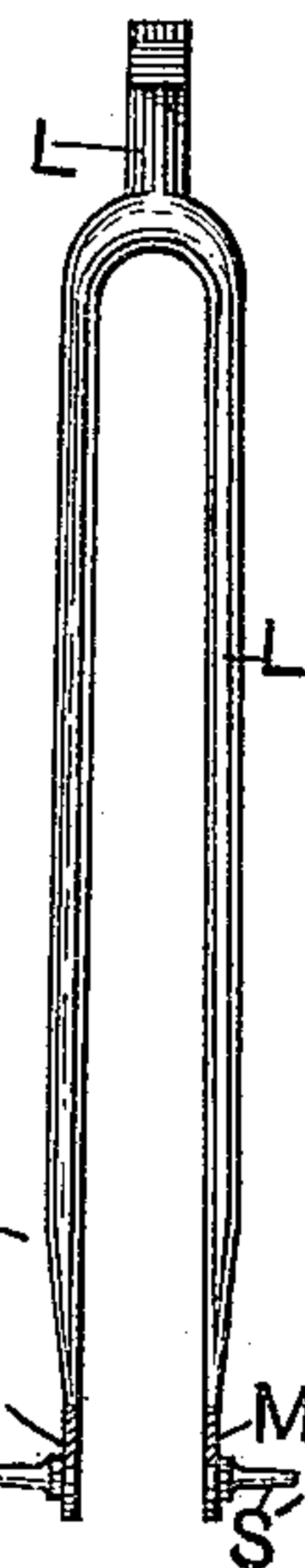


Fig. 8.

Fig. 9.



WITNESSES:

T. W. Hiler
W. A. Bowers

INVENTOR:

John F. Brady
By his atty Oscar Snell

No. 641,366.

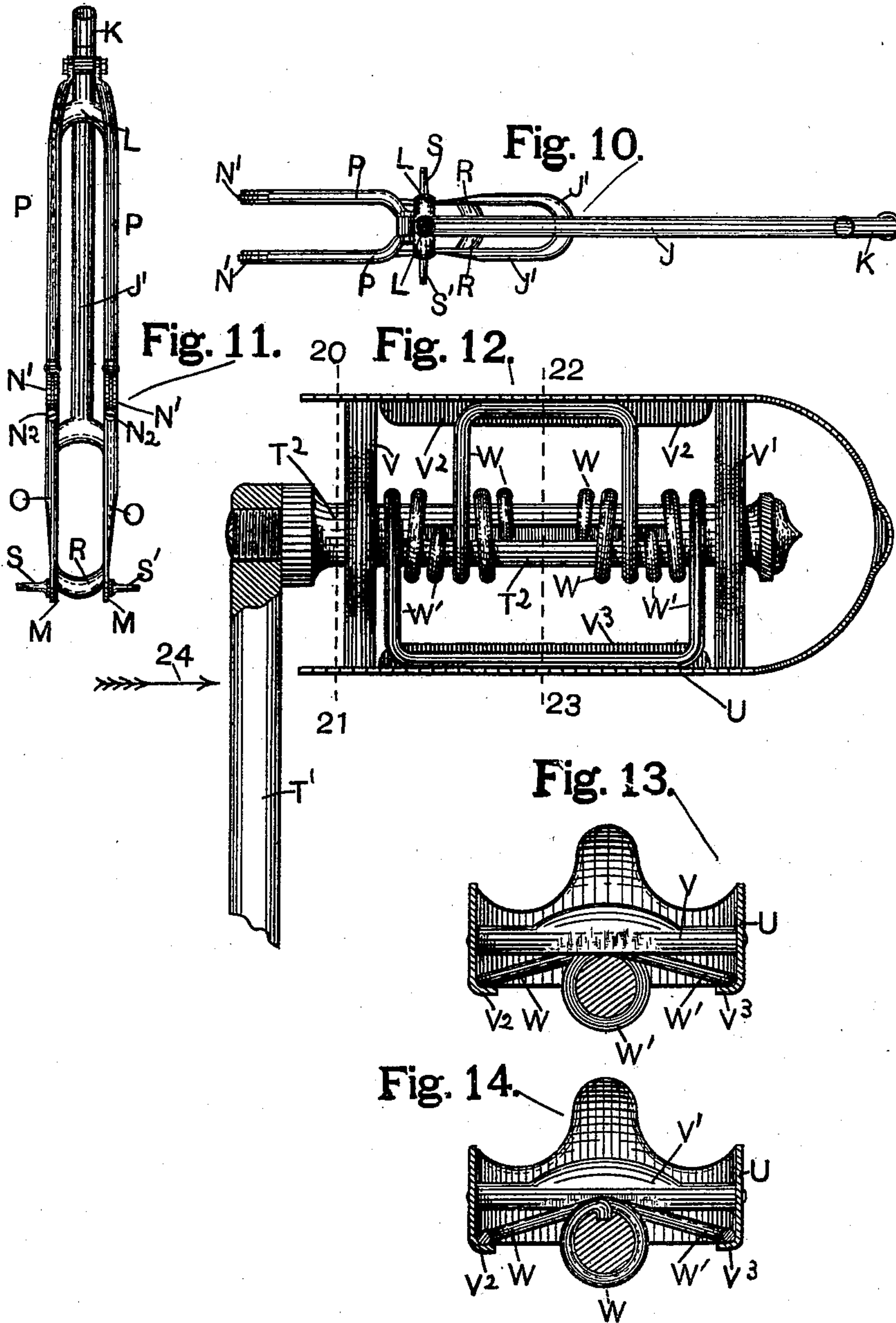
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W. A. Bowers

INVENTOR:

John F. Brady
By his atty.
Oscar M. M. M.

UNITED STATES PATENT OFFICE.

JOHN F. BRADY, OF CHICAGO, ILLINOIS.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 641,366, dated January 16, 1900.

Application filed September 8, 1898. Serial No. 690,504. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. BRADY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Bicycle, of which the following is a specification.

My invention relates to chainless bicycles; and my object is to provide a system of gearing for transmitting power from the rider to the drive-wheel and also a special construction of the main frame and other parts to form a strong mounting for such gearing, whereby great strength, durability, speed, and high efficiency are attained at a comparatively low cost, the same being fully described hereinafter and is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a bicycle in which is embodied by improvements. Fig. 2 is an axial section of the driving cog-gear, the rear or driving wheel axle, and the hub of the rear or driving wheel, together with several ball-bearings and one-half of the crank-axle and a portion of one of the cranks and clamps at the lower ends of the rear-seat-post column-braces and at the upper ends of the lower rear frame-braces, which clamps form an attachment with the outer end portions of the driving-wheel axle, the other parts being shown in rear elevation and hereinafter particularly described. Fig. 3 is a vertical axial section of the rear drive-wheel hub and several parts connected therewith on broken line 15 16, Fig. 2, looking in the direction indicated by arrow 17, to illustrate relative position of internal and spur cog-wheels. Fig. 4 is a rear elevation of the parts comprising the axle of the drive-wheel. Fig. 5 is a side elevation of the drive-wheel axle, looking in the direction indicated by arrow 18, Fig. 4. Figs. 3, 4, 5, and 6 are drawn to one-half the scale shown in Fig. 2. Fig. 6 is a plan of the rear axle. Fig. 7 is a side elevation of the main frame of the bicycle, showing hinged clamp for firmly yet removably holding one end of the rear axle in position in the frame. Fig. 8 is a plan of the lower and middle of length portion of the lower front reach, looking in the direction indicated by arrow 19, Fig. 7. Fig. 9 is a detached rear elevation of the bifurcated seat-post column. Fig. 10 is a plan

of the main frame illustrated in Fig. 7 in side elevation, and Fig. 11 is a rear elevation of the same. Fig. 12 is a plan of a pedal particularly adapted to this system of bicycle-gearing, where only a partial movement around the pedal-pin of the pedal-lever is necessary, and is intended as a substitute for the usual ball-bearing pedal adapted to use in combination with the crank-movement in ordinary chain bicycle-gearing. Fig. 13 is a cross-section of the pedal on broken line 20 21, Fig. 12; and Fig. 14 is a cross-section on line 22 23, Fig. 12, looking in both figures in the direction indicated by arrow 24.

Similar letters indicate like parts throughout the several views.

It is intended in this bicycle to provide a system of cog-gearing inclosed within the hub of the rear drive-wheel in combination with a foot-lever on each side and in connection with a crank-axle of the system in substitution for the crank-movement and chain and sprocket-wheel gearing of the ordinary bicycle, and since the ordinary construction of a bicycle-frame is not adapted to receive this system of gearing a special construction has been provided to insure strength and adaptability to properly support the parts mounted thereon, and to avoid complication and expense a new form of pedal has been devised which is particularly adapted to use in combination with the pedal-lever of the mechanism hereinafter described.

The hub of the rear drive-wheel A is of a hollow substantially cylindrical construction and comprises a main body portion consisting of two separate side parts B and B', which are fitted together by the open end of one being inserted into the enlarged open end of the other, as shown in Fig. 2, and is mounted on ball-bearings on an axle whose end portions C and C' project at both sides of the hub and are held by means of a clamp at each side of the frame, as hereinafter described. The inside ends of the portion C and C' of the axle are connected by means of a substantially U-shaped part or web C² at one side, and at the opposite is another substantially U-shaped part or web C³, having but one of its ends directly connected with the end portion C', the other end of C³ being

connected with a lateral arm or web C^4 from portion C by means of a bolt D, which forms the pivotal center of a ball-bearing device, upon which is mounted a small spur cog-wheel E, Figs. 2 and 3. This construction is productive of a hollow axle comprising cylindrical end portions connected by diametrically opposed U-shaped webs, one of which is divided, the contiguous ends of the divided web being overlapped and substantially parallel for the reception of the bolt D, which connects the ends of the web and constitutes a journal parallel with the axle for the reception of the gear-wheel E, as stated. Secured to the part B, inside of the hollow hub B B', is a spur cog-wheel F.

Mounted on ball-bearings inside and through axle C C' is a shaft G, whose outer ends project at each side of the bicycle-frame and terminate in cranks, and each crank has a pin G^3 or G^4 , adapted to receive a connecting-rod, such as H and H'. Secured to the shaft G is an internal cog-wheel I, which engages the spur cog-wheel E, the latter being in engagement with the spur cog-wheel F, which is connected with the hollow hub B B' of the drive-wheel.

The main frame of the bicycle, in whose rear end portion the rear wheel is secured, comprises the usual upper and lower reaches J and J', connected at their front ends with the steering-head spindle-case K.

The seat-post column L is disposed vertically instead of at the usual rearward inclination. The greater part of the length of the column L is bifurcated, as is also the lower end portion of the lower reach J, so as to straddle the rear driving-wheel, and both are of much greater length than in any ordinary bicycle in order to hold the connections M and M' at the lower ends of the side members of the bifurcations of the frame close to the ground and relative to the rear drive-wheel farther to the rear than the ordinary crank-shaft bracket is disposed.

The ends of the axle of the rear drive-wheel are mounted in a clamp at each side of the main frame, which clamps, as seen in Figs. 1 and 7, each consists of a stationary part N, having a semicircular depression to receive the front half of the axle, and to this part is pivotally mounted at one end a semicircular part N', also adapted to close around the rear surface of the axle, and is held in the closed position by means of a screw N^2 , Fig. 1.

The axle-clamps form a part of the extreme rear portion of the frame by being secured to the upper ends of rear braces O and O', whose ends are secured to frame-bosses M and M', and by being secured to the lower ends of the upper rear braces P and P', whose upper ends are secured to the seat-post column, as usual, in order to effectually prevent any distortion of the lower corner of the frame at the frame-bosses M and M', a U-shaped brace R is disposed around the drive-wheel run from one member of the bifurcation of reach J' to the

other, as plainly shown in Fig. 1 and also shown in Figs. 7, 8, 10, and 12.

On stationary pins S and S', which project from the frame-bosses M and M', are mounted on ball-bearings the rear ends of the pedal-levers T and T', which vibrate in a vertical plane, and their motion induced by the feet of the rider upon the pedals U and U' is communicated to cranks G^1 and G^2 by means of the connecting-rods H and H', whose front ends are pivotally attached to the pedal-levers and the rear ends thereof pivotally connected with the pins of cranks G^1 and G^2 , as before stated.

The pedals U and U', Fig. 1, are shown on a large scale in Figs. 12, 13, and 14, and each pedal consists in this instance of a frame of a U shape, with the side members connected by cross-pieces V and V'. The bottom edges of the frame at each side are turned inwardly to form ledges, such as V^2 and V^3 .

There is a pin T^2 secured in and projecting laterally from the pedal-lever, and upon this pin is mounted the pedal, with the under flat surfaces thereof at about the middle of their length in contact with the upper surface of the pin. The pedal is held in contact with the pin by means of springs W and W', whose end portions are coiled around the pin, and each end terminates in a bent-in portion, forming a hook which engages in a groove T^3 in the pedal-pin. Each of these springs has a middle of length portion projecting outwardly from the pin, so that spring W contacts ledge V^2 and spring W' contacts ledge V^3 of the frame, and each of the springs also contacts the inside vertically-disposed surface of the frame, so that it is held from lateral movement.

When the parts comprising the pedal are assembled, as shown in Fig. 12, the springs are closely wound upon the pedal-pin, and in the operation of placing the pedal-frame in position are unwound slightly, so as to exert a strong pressure upon the ledges V^2 and V^3 , and thus hold the pedal-frame cross-pieces V and V' in close yet yielding contact with the pedal-pin, so that the pedal may be vibrated on the pin, and thus be adjusted by the pressure of the feet of the rider to any position to allow for the change in angular position by the pedal-lever. Since the springs as arranged would exert a force one against the other, the pedal will be returned to some initial position when pressure upon them is discontinued.

It is obvious that the pedal may have some initial position exactly suited to the starting position when the rider mounts the bicycle, and thus avoid any delay in adjusting the pedals for a mount.

In riding this bicycle the downward pressure of the feet of the rider upon the pedals is transmitted through rods H and H' to cranks G^1 and G^2 , thence through internal cog-wheel I and spur-wheel E' to spur-wheel F and the driving-wheel A, the combination

of the gearing being such that cranks G' and G² revolve in a direction opposite to the direction of revolution of driving-wheel A.

I claim as my invention—

5 1. In a bicycle, the combination with a frame and hollow axle comprising two cylindrical end portions and connecting-webs, of a wheel-hub mounted upon the axle and provided with an inwardly-extending concentric spur-rim, a shaft extending through the axle, an internal gear-wheel fixed upon the shaft and a gear supported by one of the webs of the hollow axle and meshing with the internal gear and spur-rim.

15 2. A bicycle-gearing comprising a hollow hub provided with an internally-mounted annular gear-rim, an internal gear, a gear-wheel intermediate of and meshing with the rim and internal gear, a hollow axle comprising two cylindrical end portions and an intermediate frame springing from one of the end portions beyond the inner end of the gear-rim and extending thence across the train of the gears and around the periphery of the internal gear to the other end portion of the axle.

3. In a bicycle the combination with the

axle of the rear wheel, comprising substantially cylindrical end portions, substantially U-shaped lateral webs connecting and spacing the end portions of the axle, one of said webs being composed of two parts springing respectively from the end portions of the axle, of a bolt connecting the divided web, a gear-wheel journaled upon said bolt, a hub, a gear-rim, and an internal gear mounted between said webs and meshing with the gear-wheel.

4. A bicycle-frame comprising a bifurcated seat-post column, a bifurcated lower reach connected at its lower ends to the lower ends of the seat-post column, a curved yoke extending between the bifurcations of the lower reach adjacent to their lower ends, and lower braces of less length than the radius of the bicycle-wheel and extending from the lower end of the seat-post column.

In testimony that I claim the foregoing I have hereunto set my hand this 3d day of September, 1898, in the presence of witnesses. JOHN F. BRADY.

Witnesses:

H. L. BROWN,
OSCAR SNELL.