

(No Model.)

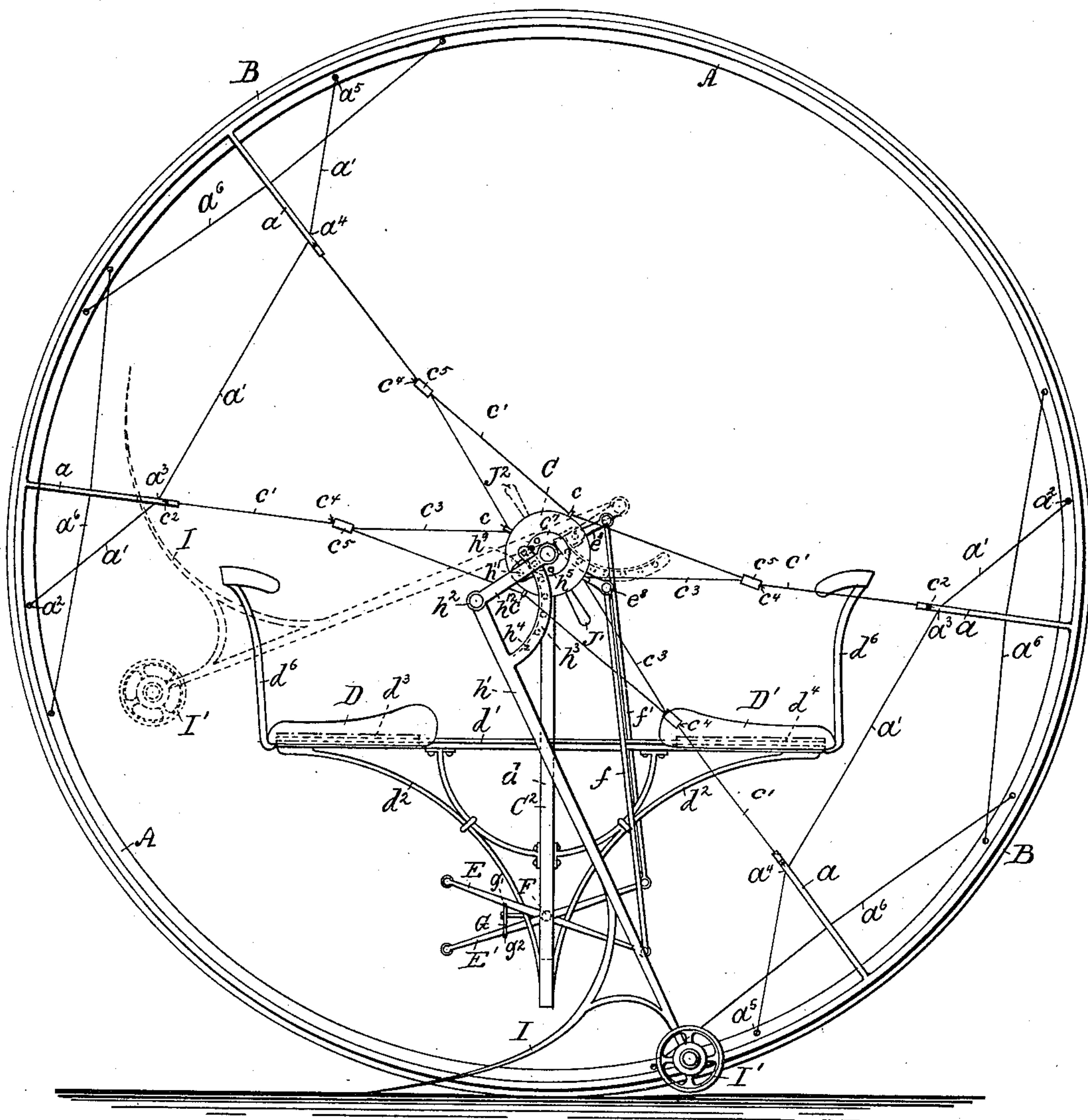
3 Sheets—Sheet 1.

H. BEHR.
MONOCYCLE.

No. 379,849.

Patented Mar. 20, 1888.

Fig. 1.



WITNESSES:

Thomas M. Smith.

INVENTOR:

Herrmann Behr,
by J. Walter Douglas,
Atty.

(No Model.)

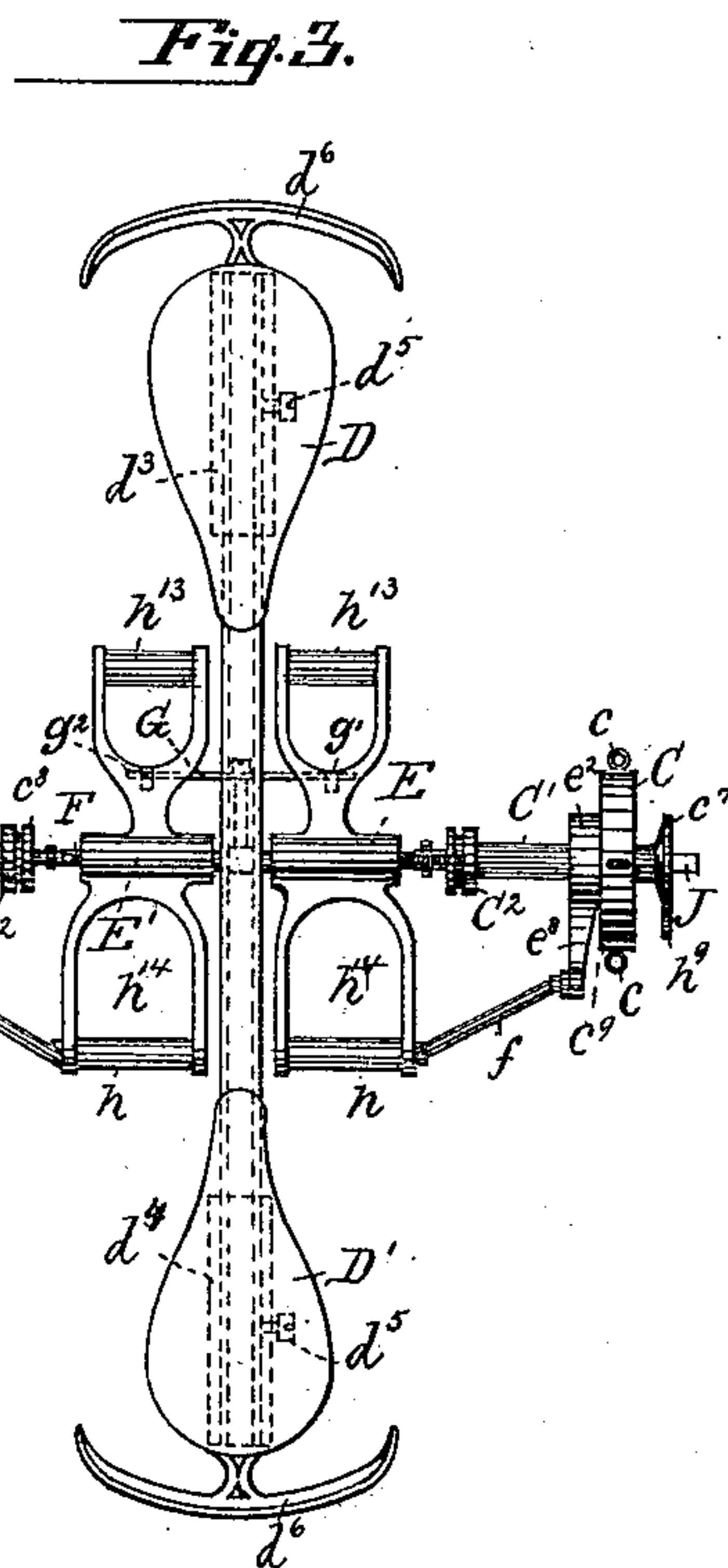
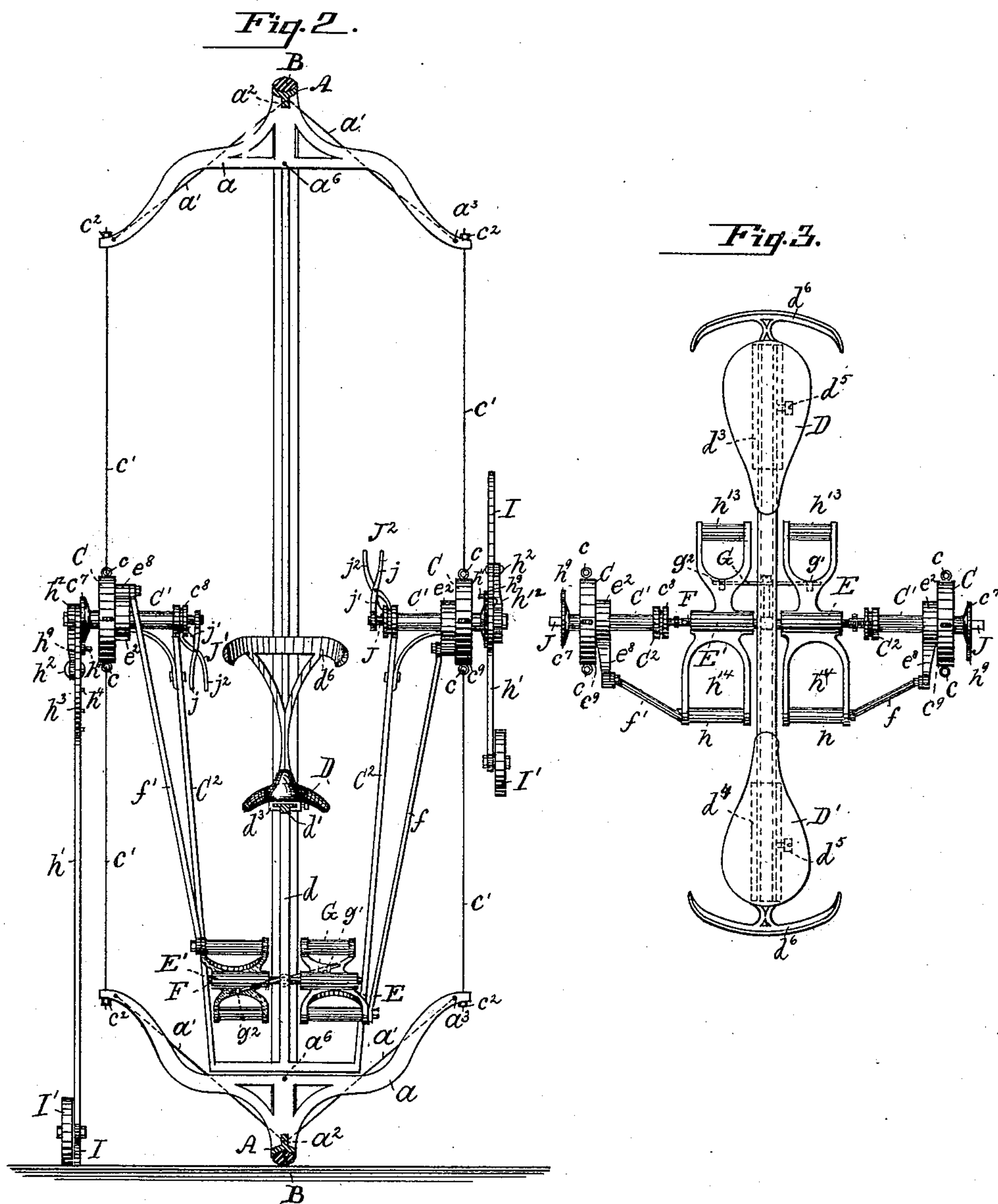
3 Sheets—Sheet 2.

H. BEHR.

MONOCYCLE.

No. 379,849.

Patented Mar. 20, 1888.



WITNESSES:

Hermann Bornann.
Thomas M. Smith.

INVENTOR:

Hermann Beler.
by J. Walter Douglas.
Atty.

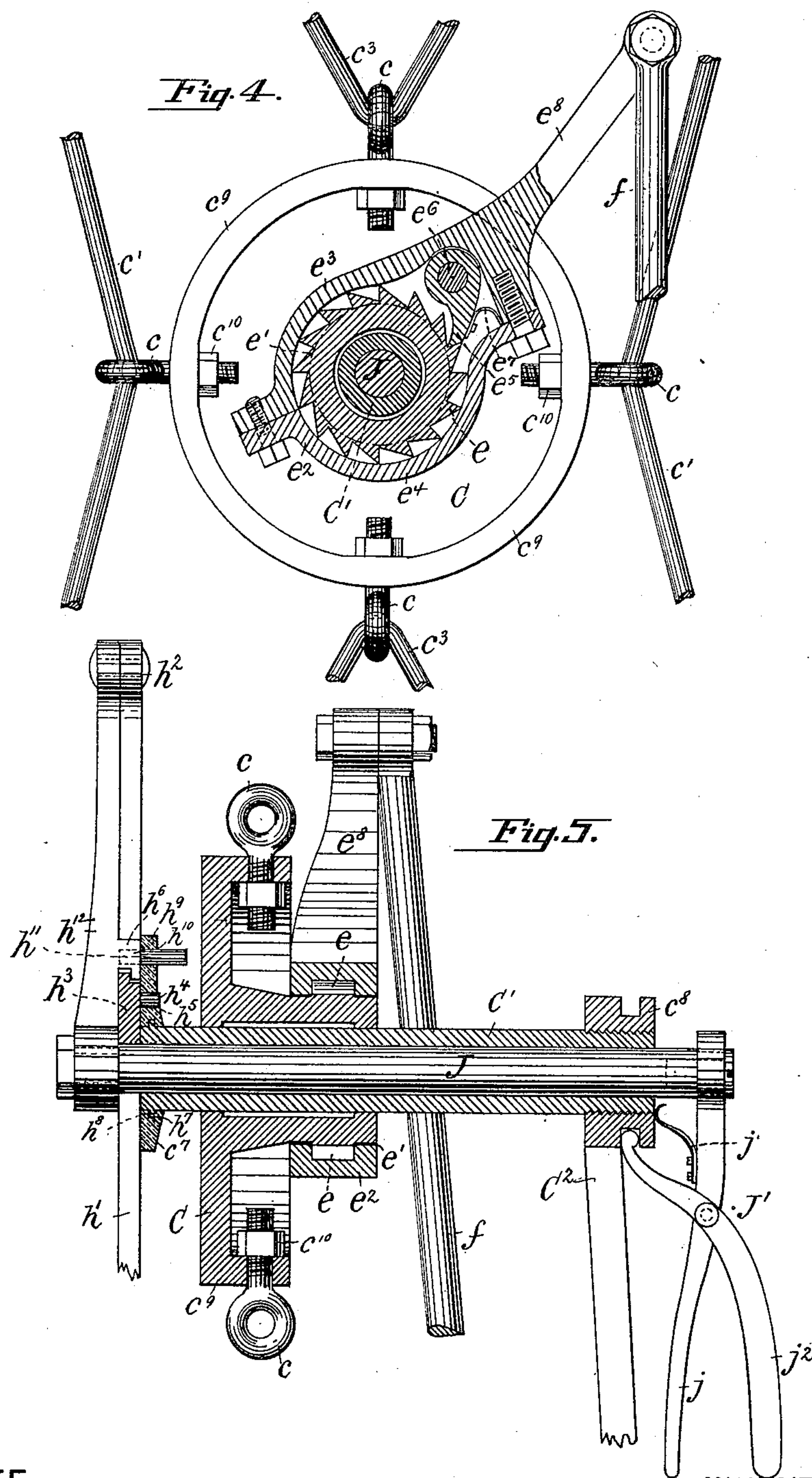
(No Model.)

3 Sheets—Sheet 3.

H. BEHR.
MONOCYCLE.

No. 379,849.

Patented Mar. 20, 1888.



WITNESSES:
Hermann Bommann,
Thomas M. Smith.

INVENTOR:
Hermann Behr.
by J. Walter Douglass,
Atty.

UNITED STATES PATENT OFFICE.

HERMANN BEHR, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO FREDERICK FRIEDGEN, OF SAME PLACE.

MONOCYCLE.

SPECIFICATION forming part of Letters Patent No. 379,849, dated March 20, 1888.

Application filed November 7, 1887. Serial No. 254,464. (No model.)

To all whom it may concern:

Be it known that I, HERMANN BEHR, a subject of the Emperor of Germany, but now residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Monocycles, of which improvements the following is a specification.

This invention relates to certain new and novel features of improvement in that class of velocipedes or vehicles having but a single wheel and designated as a "monocycle."

The principal object of my invention is to provide a monocycle of a simple construction in which the dimensions thereof are reduced and lateral friction of the axial parts are overcome, which has been one of the main objections to a one-wheeled vehicle as heretofore constructed with spokes, as such friction has a tendency to retard the free and easy movement thereof; and a further object of my invention is to provide the vehicle with suitable simple mechanism or devices operated by hand for steering and checking its speed *ad libitum*; but the more important feature of this invention is that it can be maintained in a vertical position whether in motion or at rest, thus obviating any tendency to overturn and insuring perfect safety in mounting the one or more seats suitably supported therein from the center for the accommodation of a like number of persons, and, moreover, affording greater security or freedom from dangers heretofore attending the riding in monocycles as previously constructed over rough or hilly roadways; and, furthermore, my improved monocycle is so constructed and the seat or seats therein so arranged that they are readily accessible from any point, which is quite important, because if from any unforeseen cause the vehicle should overturn the occupant or occupants thereof cannot be injured, for the reason that the seat or seats are arranged swung from the center of the structure in such manner as to occupy a position but a slight distance above the ground, and then, again, the starting up of the vehicle is accomplished only after the person or persons are seated comfortably therein, through the manipulation by the feet of suitable simple mechanism with such ease of movement as that perfect control of the vehicle will be insured with absolute certainty and safety,

and in a manner to be hereinafter more particularly explained.

I am aware that previous to my invention it was attempted to operate a monocycle by a person while standing erect within the wheel, in which the operator stepped under a rolling rim just forward of certain ribs, and walking or running unimpeded on the ground, with both hands grasping hand-holders, and pushing the vehicle forward until it had acquired sufficient motion as to admit of his stepping upon pedals, when he dropped certain wrist-yokes into a horizontal position against his wrists and continued the movement by transferring his weight alternately from one pedal to the other as it descended, taking care to steady himself by stationary hand-holders on the axis of the wheel, and, furthermore, that a monocycle has been designed so as to admit the rider through spokes to a seat hung on the axle thereof and within the wheel, and with the seat supported on an arm from which a bar projected downward and whereon two foot-rests were connected by a strap or band passing over a pulley for actuating the vehicle; but one of the principal objections to the latter form of a monocycle is that lateral friction on the axial parts must be overcome, or otherwise such will retard the free and easy movement thereof. This I overcome entirely and construct a monocycle differing in many essential particulars from the above-mentioned forms, as will be readily understood from the following description.

The nature and scope of my invention will be more particularly understood taken in connection with the accompanying drawings, wherein I have illustrated the same in a form found practically efficient, and in which—

Figure 1 is an elevation of my improved double-seat monocycle. Fig. 2 is a central section thereof, showing the mechanism for operating the same, the steering devices, and the adjustable seats. Fig. 3 is a plan view of the seats and the operating mechanism. Fig. 4 is a detail view, partly in section and partly in elevation, of the driving or operating mechanism; and Fig. 5 is a similar view showing the hub with its ratcheted surface and the shell formed integral with said hub, the rod for operating the pawl, and the steering mechanism.

Referring to the drawings for a further de-

scription of the invention, A represents the rolling rim or tire, made, preferably, T-shaped in section, of any suitable material, the surface of which is grooved out to receive the ring B, of rubber or other suitable material. Formed integral with or otherwise secured to the tire A are four struts, a , arranged opposite each other, and their angles being at about forty-five degrees and one hundred and thirty-five degrees, respectively, from the center of the wheel. These struts are secured onto the web of the tire A and project outward from both sides of the tire and upwardly for supporting concentrically the respective hubs C, in a manner to be hereinafter fully described. The struts a of the tire A are braced by means of metallic wires or rods a' , so as to insure greater rigidity to these struts. The rod a' , for example, is suitably fastened at one end to the web of the tire A at a^2 , and thence passes through an eye, a^3 , in one end of the first strut a , thence passes through another eye, a^4 , in the second strut a on the same side, thence through an eye, a^5 , formed in the web of the tire A, and thence through the eyes in the opposite ends of the two struts a , the free end of which rod is then secured to the former end of the rod a' by forming a knot, or the two ends of the rod a' may be provided with right and left threads and a swivel-nut attached thereto for holding the two ends firmly together. The tie-rods a^6 are suitably fastened in apertures provided in the web of the tire A and pass through central openings in the respective struts, and which tie-rods are employed to equalize the power or weight upon the whole structure—that is to say, to prevent the tire from its light nature from becoming transformed from its circular form into undesirable shapes.

At suitable distances apart in the surface of each shell c^9 of the hub C are inserted four eyes, c , which are held to place by means of nuts c^{10} , fitted to the threaded stems of these eyes from the interior thereof. These shells and hubs are supported centrally in position by means of the metallic tie-rods c^1 and c^3 , which pass through the respective eyes c of the shells. The tie-rods c^1 , having their respective end extremities threaded, are inserted through the ends of the struts a and held thereto by means of nuts c^2 , and the respective hubs are thereby readily adjusted or tightened. On the respective stays or tie-rods c^1 , between the eyes of the shell and the struts, are rigidly secured collars c^5 for the reception of the extremities of the tie-rods c^3 . Each tie-rod c^3 passes through an eye c in the shell c^9 of the hub C, and is provided with threaded extremities inserted through said collars c^5 , and to which extremities nuts c^4 are attached for holding each hub in proper position.

It will be seen from the drawings that easy access to the seats can be had from either side of the vehicle, and, furthermore, that all side friction between the hub and axle is overcome, which has been one of the main objectionable

features to many of the heretofore existing monocyclus with spokes, and, moreover, when spokes are used the vehicle has to be constructed very large in diameter in order to secure the requisite amount of space for the seat and pedals, while by my arrangement the pedals or foot rests are only a short distance above the ground, and hence, as the seats are located beneath the axle, the center of gravity will therefore fall beneath the axle, and the balance, as well as the operation, of this monocyclus will be much easier accomplished than by any of those heretofore constructed.

The hubs C are loosely mounted onto sleeves C' , Fig. 5, around which they revolve by mechanism to be hereinafter described. To these sleeves C' a frame, C^2 , in the form of a stirrup, is fastened, supporting the seats D and D' , adjustably mounted on the horizontal T-shaped bar d' , supported by the vertical post d and brackets or struts d^2 , suitably bolted to said T-shaped bar.

The mechanism for operating my improved monocyclus will now be described.

Each hub C has a ratchet, e , cast therewith, or this ratchet may be secured thereto in any other suitable manner, and on each side of this ratchet e is a smooth-surfaced rim, e' , on which the pawl-lever collar e^2 operates, and which collar is preferably made in two parts, e^3 and e^4 , suitably secured together—for instance, as shown in Fig. 4. The pawl e^5 , held in the upper section, e^3 , by the pin e^6 , is kept in contact with the ratchet e by the spring e^7 . Integral with the upper section, e^3 , of the collar e^2 is formed a lever-arm, e^8 , for operating the pawl e^5 . The double pedals E and E' , journaled to the shaft F, are connected to the lever e^8 of the pawl-lever collar e^2 by the connecting-rods f and f' , and are operated by either one or two persons sitting on the seats D and D' . The lever G is located beneath the pedals E and E' , with its ends fitting into eyes g' and g^2 , fastened to the underside of the pedals E and E' , and this lever is pivoted at its center to the vertical post d , rising from the frame C^2 . This lever G serves to throw one pedal, E or E' , with its connecting-rod f or f' and lever e^8 , respectively, upward while the other is moved downward by the foot of the operator, and vice versa, in order to accomplish a steady movement of the monocyclus.

If the monocyclus is operated by two persons, the seats D and D' will be in the position shown in Figs. 1 and 3 of the drawings, with their respective feet on each roller h and h^{13} , journaled in the ends of the pedals E and E' ; but if only one person is riding therein the seat D will be brought to the center of the T-bar d' , so as to have the center of gravity beneath the center of the monocyclus, and the feet of the operator will act on the rollers h , having the heels thereof in the openings h^{14} of the pedals E and E' . The seats D and D' are fastened onto slides d^3 and d^4 , encircling partially the horizontal T-shaped bar d' , and are held thereto by means of set-screws d^5 . These seats may be

made of any convenient shape, having springs between them and the slides d^3 and d^4 , so as to overcome whatever jarring may be produced in riding over uneven roadways, and these seats are by preference provided with backs d^6 , to afford more comfort to the persons riding and a feeling of greater security.

To steer, brake, and guide my improved monocycle, the springs I and rollers I' are employed on each side and are operated by the following mechanism: A shaft, J, revolving in each of the sleeves C', has at one end a handle, j , and at the other end, at a right angle to this handle j , an arm, h^{12} , Figs. 1, 2, and 5. To this arm h^{12} a bar, h' , is hinged or pivoted at h^2 , having a recessed arch, h^3 , provided with a series of pins, h^4 , fitting into a hole, h^5 , provided in the disk c^7 . This disk c^7 is feathered to the sleeve C', and is revolved around the same by its arm h^9 , having a hole, h^{10} , into which a pin, h^{11} , fastened to the arm h^{12} , slides. To guide the arch or quadrant h^3 and hold it more rigidly, a recessed stud, h^6 , is also fastened to the arm h^{12} , as shown in Fig. 5. One of the pins h^4 of the arch is always kept in the hole h^5 of the disk c^7 by the action of the spring j' , fastened to the handle j and bearing against a grooved hub, c^8 , of the frame C²; but if it should become necessary to change the position of the spring I and roller I' the pin h^4 may be brought out of contact with the disk c^7 by the handles j and j^2 . The handle j^2 is pivoted to the handle j , which is secured to the outer extremity of the shaft J, and the handle j^2 has a curved upper extremity which engages with a groove formed in the hub c^8 . By pressing both handles j and j^2 the spring j' is compressed and the shaft J moves outward, and with it the arm h^{12} , arch h^3 , stud h^6 , and pins h^4 and h^{11} . The pin h^4 is now released from the disk c^7 , while the pin h^{11} is still engaged with the arm h^9 of the disk c^7 , and by turning the handles j and j^2 now to the left, as shown in Fig. 1, the bar h' , and with it the spring I and roller I', will rise, the disk c^7 will be turned by the pin h^{11} , presenting the pin h^4 to the hole h^5 of the disk c^7 , and by decreasing the pressure of the handles j and j^2 the spring j' will be brought into action and the pin h^4 will engage with the hole h^5 of the disk c^7 , thereby suspending and holding the spring I and roller I' at any desired height above the ground.

To steer my improved monocycle around a corner or to describe a curve with it, both devices J' and J², provided with handles j and j^2 , are grasped by the operator and compressed to release the pins h^4 on the disks c^7 , and by turning both devices J' and J² in opposite directions—that is to say, bringing the spring I and roller I' at one side of the monocycle in contact with the ground, and with the spring I and roller I' on the opposite side out of contact with the ground—or, by turning one of the devices J' or J² slightly, the roller I' and spring I will be allowed to slide upon the ground, thereby turning or steering the monocycle in the direction desired.

To stop the monocycle, both devices J' and J² should be turned in one direction, causing the springs I and rollers I' on both sides to slide sufficiently on the ground to promptly retard its motion, and finally stop the monocycle, if from any cause it ceases to come to a dead-stop through failure to operate the pedals actuating the ratchet mechanism. If the operator has a good road, he may elevate the rollers I' and springs I out of contact with the ground, as shown in dotted lines in Fig. 1, and the spring j' of the handles j will serve to hold the pins h^4 of the arch in the hole h^5 of the disk c^7 , thereby keeping the bars h' , on which the springs I and rollers I' are fitted, in position without the aid or assistance of the operator.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A monocycle provided with struts secured to the tire of the wheel, two hubs supported concentrically to the wheel by means of tie-rods attached to said struts, and wires or rods passing through eyes in the hubs and held by means of collars secured to said tie-rods, substantially as described.

2. A monocycle provided with struts secured to the tire of the wheel, two hubs supported concentrically to the wheel by means of tie-rods fastened to said struts and wire rods passing through eyes in said hubs and held in position by collars rigidly mounted on said tie-rods, a depending frame secured to sleeves on which said hubs are loosely mounted, a T-shaped bar and curved strut secured thereto and carried by said depending frame, and one or more seats mounted on said bar, substantially as described.

3. A monocycle provided with curved struts fitted to the web of the tire, two hubs supported vertically to said struts and concentrically to the wheel by means of tie-rods and wire stays or rods, a hanging frame rigidly secured to sleeves on which said hubs are mounted, a vertical post secured centrally to the bottom of said frame, a horizontal T-shaped bar supported thereby, and two seats adjustably attached to said bar, substantially as described.

4. A monocycle provided with struts fitted to the tire and curved outwardly from the center thereof, two hubs supported concentrically to the wheel by means of tie-rods and stays, substantially as described, a depending frame attached to sleeves on which the hubs are loosely mounted, a vertical post secured to the bottom of said frame and supporting a bar to which two seats are adjustably secured, and a pawl-and-ratchet mechanism connected by rods to pedals mounted on a shaft passing through said vertical post and held in the sides of said frame, whereby said vehicle may be impelled, substantially as shown and described.

5. A monocycle provided with four struts fitted to the tire thereof and curved upwardly from the center, two hubs supported vertically to the extremities of said struts and concentrically to the wheel by means of tie-rods and

stays or wires secured to the parts substantially in the manner described, a hanging frame attached to sleeves, one or more seats adjustably secured to a T-shaped horizontal bar mounted on a vertical bar supported in the bottom of said frame, and pawl-and-ratchet mechanism connected by rods with double pedals mounted on a shaft held in the sides of said frame, substantially as described.

6. The combination, with a tire having an elastic ring fitted snugly up against the bottom thereof, of the struts *a* and metallic tie-rods *a'* and *a''*, substantially as and for the purposes set forth.

7. The combination, with the T-shaped tire having the bottom thereof grooved out for the reception of an elastic or rubber ring, of the struts *a*, fitted to the web of the tire and curved upwardly on both sides from the center thereof, and the tie-rods *a'* and *a''*, passing through said struts and secured to the web of said tire, substantially as and for the purposes set forth.

8. The combination, with the rolling rim or tire A, rubber ring B, struts *a*, fitted to the web of said tire, and the tie-rods *a'* and *a''*, inserted through apertures in said struts and secured to said tire, of the hubs C, having eyes *c*, the tie-rods *c'*, attached to said struts and supporting said hubs, and wires or stays *c''*, inserted through eyes in said hub and held in position by collars *c'''*, rigidly secured to the tie-rods *c'*, substantially as and for the purposes set forth.

9. In a monocycle, the combination, with two hubs loosely mounted on sleeves and supported concentrically to the wheel by means of tie-rods attached to struts secured rigidly to the web of the tire, and stays or wires inserted through eyes in said hubs and supported by collars rigidly attached to said tie-rods, ratchets formed integral with said hubs, pawls pinned to two-part boxes, the upper sections of which are formed integral with arms, and depending rods pivoted to said arms, of a hanging frame secured to said sleeves and supporting adjustable seats and pedals mounted on a shaft held in the sides of said frame, substantially as and for the purposes set forth.

10. In a monocycle, the combination, with a shaft on each side of the wheel, with sleeves mounted thereon and carried by a hub supported concentrically to the wheel, substantially in the manner described, of an arm secured to said shaft, a depending bar hinged to the upper extremity thereof, having an arch or quadrant with a series of pins, a disk feathered to said sleeve, having an opening therein, said disk being revolved around said sleeve by an arm having an opening therein, into which a pin slides fastened to the arm secured to said shaft, a device provided with two handles pivoted to each other and one of which is rigidly secured to one extremity of said shaft and the other engaging in a groove formed

in a hub mounted on said sleeve, and a spring secured to one of said handles, all arranged substantially as and for the purposes set forth.

11. A monocycle having a hub on each side supported concentrically thereto by means of tie-rods attached to struts secured rigidly to the web of the tire and stays or wires inserted through eyes projecting from each hub and supported by collars on said tie-rods, and a shaft with a sleeve mounted thereon, in combination with an arm secured to said shaft, a depending bar hinged to said arm and having at its lower extremity a spring and roller, and a device for operating said shaft for raising and lowering said bar, substantially as described, and for the purposes set forth.

12. In a monocycle, the combination, with two hubs mounted on sleeves and supported concentrically to the wheel by means of tie-rods and struts, of ratchet-and-pawl mechanism operated by double pedals, a depending frame forming the axle for said vehicle, a vertical post secured to said frame and supporting a bar on which seats are adjustably secured, and a lever pivoted centrally to said vertical post, which serves to elevate one pedal while the other is being depressed, substantially as described.

13. In a monocycle, the combination, with a hub loosely mounted on a sleeve on each side of the wheel and supported concentrically thereto by means of tie-rods and struts, of a shaft to which an arm is attached, a depending bar pivoted thereto with a spring and roller on its lower extremity, an arch or quadrant formed integral with said depending bar with a series of pins projecting therefrom, a disk feathered to said sleeve with an opening therein, and devices, substantially as shown and described, whereby said vehicle may be readily steered or stopped.

14. In a monocycle, the combination, with two hubs mounted on sleeves and supported concentrically to the wheel by means of tie-rods and struts, of a hanging frame forming the axle for the vehicle, a vertical post secured centrally to the bottom of said frame, to the upper extremity of which a horizontal T-shaped bar is mounted, one or more seats with backs adjustably secured to said bar, a lever pivoted centrally to said vertical post for automatically elevating one pedal while the other is being depressed, and a pawl-and-ratchet mechanism connected by depending rods to double pedals journaled to a shaft secured in the sides of said depending frame, all arranged substantially as described, for impelling said vehicle.

In witness whereof I have hereunto set my signature in the presence of two subscribing witnesses.

HERMANN BEHR.

Witnesses:

HERMANN BORMANN,
THOMAS M. SMITH.