

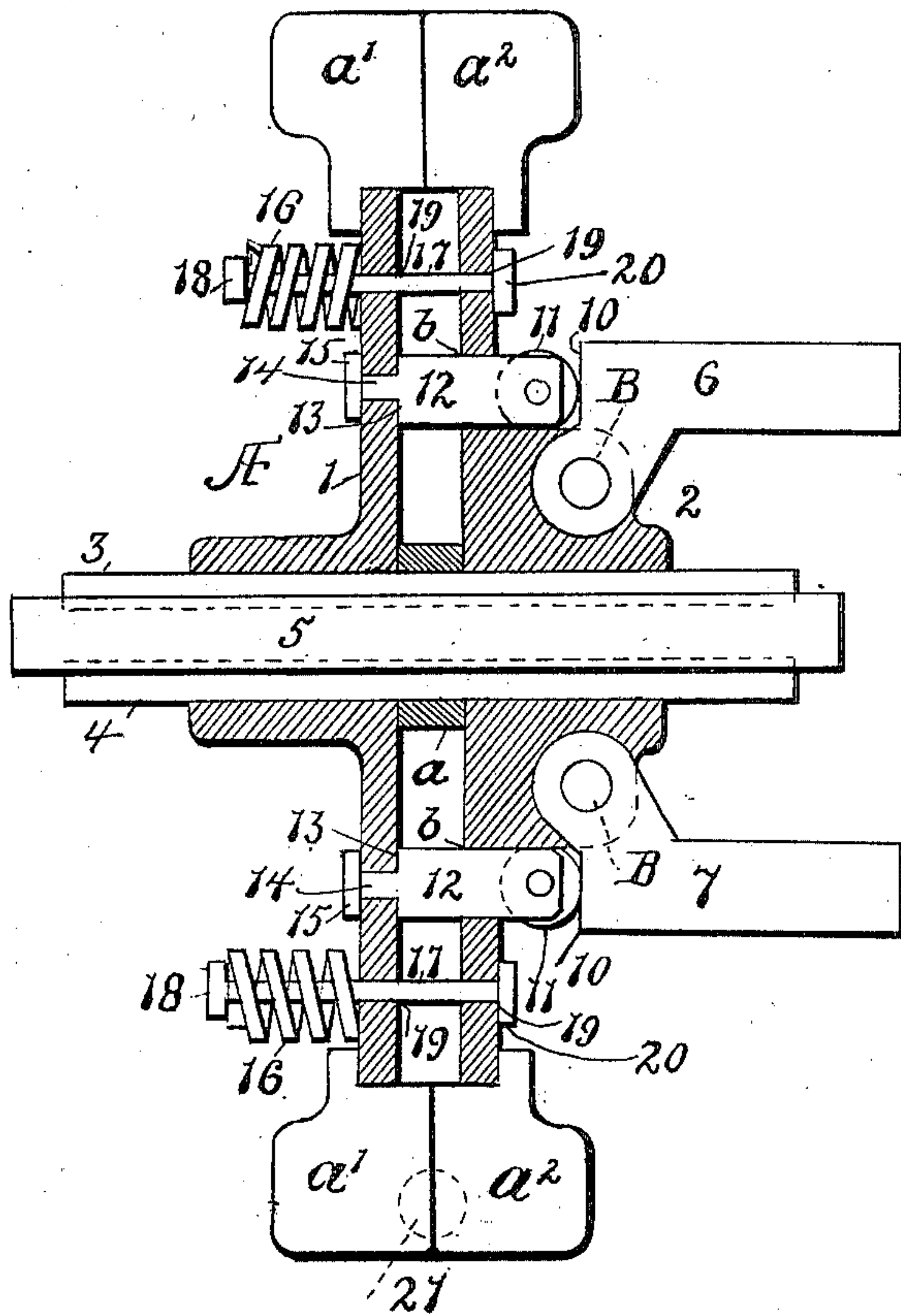
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Patented June 26, 1900.

E. F. CASSEL.
HYDRAULIC MOTOR.

(Application filed Oct. 17, 1899.)

(No Model.)



Witnesses:

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UNITED STATES PATENT OFFICE.

ELMER F. CASSEL, OF JUNEAU, ALASKA TERRITORY.

HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 652,715, dated June 26, 1900.

Application filed October 17, 1899. Serial No. 733,910. (No model.)

To all whom it may concern:

Be it known that I, ELMER F. CASSEL, of Juneau, Alaska Territory, have invented certain new and useful Improvements in Hydraulic Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

10 This invention relates to certain new and useful improvements in hydraulic motors; and it has for its object the production of a simple and inexpensive motor of this character which while in operation will be automatically regulated to maintain a uniform speed of revolution under all conditions of load or force of water.

15 In carrying out my invention I employ a wheel-body formed of two or more sections arranged to move longitudinally upon a shaft, buckets being secured to the periphery of each section. A series of weighted levers is pivoted to one of said sections and so arranged that their ends tend to separate during the revolution of the wheel-body. By means of this construction the two sections of the latter are caused to separate against the action of suitable springs, allowing a jet of water to pass either in whole or in part between the contiguous edges of the buckets of both sections instead of impinging directly there-
25 against, thereby exerting a corresponding decrease in power. The springs are so arranged that any decrease in the revolution of the wheel will cause a corresponding decrease in the centrifugal force of said levers, enabling the pressure of said springs to overcome the force tending to separate the sections of the wheel and bring the buckets together. By
30 this means a uniform speed of revolution is maintained under all conditions.

The invention will be hereinafter fully set forth, and particularly pointed out in the claims.

45 In the accompanying drawing the figure represents a transverse sectional view of my improved motor.

Referring to the drawing, *a* designates a wheel-body made up of two sections 1 2, keyed to a shaft 5 by means of keys 3 4, working in corresponding grooves formed in said shaft and said section. The inner faces of said

sections are separated by a collar *a*, buckets *a'* *a''* being secured to the periphery of each section and adjacent to each other. The collar *a* is of such width as to allow the inner contiguous edges of buckets *a'* *a''* to touch when the motor is at rest.

Weighted levers 6 7 are mounted in suitable bearings B, formed in the hub of section 2. The inner pivoted ends of said levers are provided with shoulders 10, which bear against friction-rollers 11, mounted in the outer ends of arms or members 12, which are extended through suitable openings *b* in walls of section 2 and provided with shoulders 13, bearing against the inner face of section 1. A reduced portion 14 of each of said arms or members is passed through the wall of said section 1 and provided with a head or enlargement 15, whereby the said arms or members are held in position.

The two sections of the wheel-body are normally drawn together by means of coil-springs 16, which encircle rods 17, said springs being interposed between the outer headed ends 18 on said rods and the outer face of section 1. Said rods 17 are passed through coincident holes or openings 19 in the sections 1 2 and provided with heads or enlargements 20, bearing against the outer face of said section 2. A pipe or tube 21 is arranged to direct a jet of water against the inner meeting edges of buckets *a'* *a''*.

The operation is as follows: A jet of water being directed against the buckets causes the wheel-body to rotate, the centrifugal force exerted thereby causing the free ends of the weighted levers 6 7 to move away from each other, whereupon the shoulders 10, engaging the rollers of arms or members 12, exert a pressure thereagainst, separating the sections 1 and 2 of the wheel-body against the action of springs 16. By this means the buckets of the two sections are separated, thereby permitting the jet of water to pass between the same either in whole or in part instead of impinging directly thereagainst, resulting in a corresponding decrease of power. A decrease in the speed of revolution of the wheel will cause a corresponding decrease in the centrifugal force of the weighted levers, whereupon the pressure of the springs 16 will bring the sections together as against the

pressure of said levers, whereby the gap between the buckets is diminished or entirely closed.

The advantages of my invention are apparent to those skilled in the art to which it appertains, and it will be particularly observed that I have produced a hydraulic motor which is simple and inexpensive in construction and in which a uniform speed of rotation will be maintained under all conditions of load or force of water.

It will be particularly observed that while I have illustrated and described coil-springs for drawing the sections together I do not limit myself to this construction, as any kind of a spring—either flat, compression, or expansion—can be used without departing from the spirit of my invention, and it is also within the scope of my invention to pivot the weighted levers to either of the sections of the wheel or even to the shaft in lieu of the manner shown, the essential feature being the mounting of said levers in such manner that the centrifugal force developed thereby will be exerted to separate the buckets.

I claim as my invention—

1. A hydraulic motor comprising a motor-body provided with buckets, and weighted members movably attached to a rotating part of said motor and arranged to move said buckets out of the line of impact by the centrifugal force developed in the rotation of said motor, as set forth.

2. A hydraulic motor comprising a shaft, a motor-body mounted thereon and carrying buckets, and weighted members movably attached to a rotating part of said motor and arranged to move said buckets out of the line of impact by the centrifugal force developed in the rotation of said motor, as set forth.

3. A hydraulic motor comprising a motor-body carrying buckets, levers pivoted to said body, and arranged to move the buckets out of the line of impact, and means put into operation by the centrifugal force developed in the rotation of the motor designed to operate said levers, as set forth.

4. A hydraulic motor comprising a motor-body provided with separable buckets, means put into operation by the centrifugal force developed in the rotation of said motor for separating said buckets, and means for holding said buckets normally together, as set forth.

5. A hydraulic motor comprising a body formed in sections and carrying buckets, weighted levers arranged to be operated by the centrifugal force developed in the rotation of said body, said levers being connected and arranged to separate said buckets, and means for holding said buckets normally against such separation, as set forth.

6. A hydraulic motor comprising a motor-body carrying buckets, weighted levers arranged to be operated by the centrifugal force developed in the rotation of said motor, said levers having angular portions arranged to

move said buckets out of the line of impact, and means for holding said buckets normally against the action of said levers, as set forth.

7. A hydraulic motor comprising a wheel-body formed in two sections, weighted levers pivoted to said wheel-body, and means operated by said levers for automatically varying the relative positions of said sections, as set forth.

8. A hydraulic motor comprising a wheel-body formed in sections, arms or members connected to one of said sections, weighted levers carried by the other section and engaging said arms or members, and means for normally holding said sections together, as set forth.

9. A hydraulic motor comprising a wheel-body formed in sections, arms or members carried by one of said sections, weighted levers pivoted to the other section and having shoulders designed to engage said arms or members, and means for normally holding said sections together, as set forth.

10. A hydraulic motor comprising a wheel-body formed in sections, one of said sections having holes or openings therein, weighted levers pivoted to said section, arms or members carried by the other section and projected through said holes or openings, whereby they will be engaged by said levers, and means for normally holding said sections together, substantially as set forth.

11. A hydraulic motor comprising a wheel-body formed in sections, one of said sections having holes or openings therein, weighted levers pivoted to said section and having inner shoulders, arms or members carried by the other section and projecting through said holes or openings, rollers carried by said arms or members and designed to engage the shoulders of said weighted levers, and means for normally holding said sections together, substantially as set forth.

12. A hydraulic motor comprising a wheel-body formed in sections, weighted levers arranged to automatically separate said sections, and means for holding said sections as against such separation, as set forth.

13. A hydraulic motor comprising a wheel-body formed in sections, weighted levers arranged to automatically separate said sections, a rod passed through coincident openings in both of said sections, and a coil-spring encircling said rod and arranged to hold said sections as against separation, substantially as set forth.

14. A hydraulic motor comprising a wheel-body formed in sections, buckets carried by each of said sections, arms or members carried by one of said sections, weighted levers pivoted to the other section, and arranged to engage said arms or members, and springs arranged to normally hold said sections as against separation, substantially as set forth.

15. A hydraulic motor comprising a wheel-body formed in sections, buckets carried by each of said sections, arms or members car-

ried by one section and projected through co-incident openings in the adjacent section, weighted levers pivoted to the latter section and having shoulders arranged to engage said
5 arms or members, and springs arranged to normally hold said sections as against separation, substantially as set forth.

16. A hydraulic motor comprising a wheel-
body formed in sections, buckets secured to
10 each of said sections and adjacent to each

other, and means for automatically moving said sections toward and away from each other, as set forth.

In testimony whereof I have signed this specification in the presence of two subscrib- 15
ing witnesses.

ELMER F. CASSEL.

Witnesses:

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W. C. KAUFFMAN.