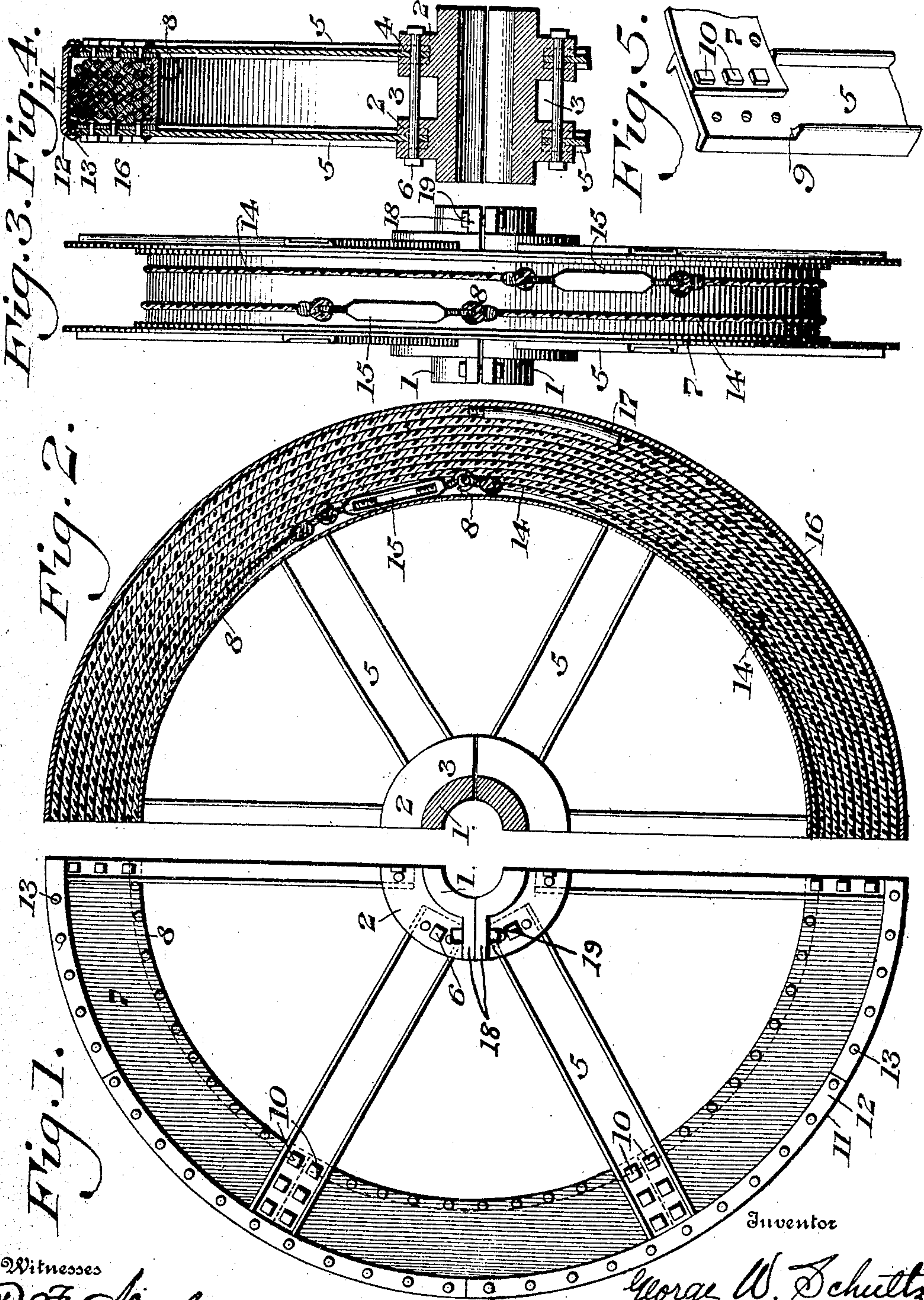


No. 860,336.

PATENTED JULY 16, 1907.

G. W. SCHULTZ.
ENGINE FLY WHEEL.
APPLICATION FILED MAY 17, 1906.



Witnesses
D. F. Nagle.
L. Rouville.

Inventor
George W. Schultz.
By
Niedersheim & Fairbanks
Attorneys

UNITED STATES PATENT OFFICE.

GEORGE W. SCHULTZ, OF ST. DAVIDS, PENNSYLVANIA.

ENGINE FLY-WHEEL.

No. 860,336.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed May 17, 1906. Serial No. 317,356.

To all whom it may concern:

Be it known that I, GEORGE W. SCHULTZ, a citizen of the United States, residing at St. Davids, Delaware county, State of Pennsylvania, have invented a new and useful Engine Fly-Wheel, of which the following is a specification.

My invention relates to engine fly wheels and consists of a novel construction which is adapted to overcome the defects and take the place of the rigid cast iron construction ordinarily employed.

One object of my invention is to construct a fly wheel of interchangeable segments which may be readily transported, erected and assembled and in which a hollow rim casing is employed which is adapted to be filled with any suitable material either concrete, sand or the like, or a cable such as a steel, iron or wire rope or chain or other similar material may be wound around the wheel until a suitable weight is accumulated to form a weighted rim.

Another object of my invention is to eliminate the possibility of the fly wheel bursting or flying in pieces which sometimes occurs in practice either owing to defective construction or to abnormal speed of the engine, thereby rendering it possible to develop a greater horse-power owing to the greater number of revolutions per minute at which the wheel may be driven and still be within the limit of safety.

Another object of my invention is to produce a construction in which there is more spring or elasticity to overcome the shocks or vibrations than there is in a rigid cast iron fly wheel.

Another object of my invention is to produce a structure in which the weight of the crank shaft may be accurately counterbalanced according to conditions and requirements.

To the above ends my invention consists broadly of a fly wheel having a sectional or other hub and a hollow rim member adapted to be filled with any solid or continuous material to form the weighted rim, the rim sections being connected with the hub by means of steel or iron beams or tubes of any desired construction.

It further consists of a fly wheel in which the I-beams, plates or tubes forming the spokes of the fly wheel are attached at their outer ends to the rim casing, which latter is composed of a number of rectangular-shaped boxes preferably made of a suitable thickness of iron or steel plates, the top and bottom plates being curved to conform to the circumference of the fly wheel.

It further consists of other novel features of construction, all as will be hereinafter fully set forth.

The various instrumentalities of which my invention consists may be differently arranged and organized and

in the accompanying drawings I have shown one embodiment thereof which gives in practice satisfactory and reliable results.

Figure 1 represents a side elevation of a portion of a fly wheel embodying my invention. Fig. 2 represents a sectional elevation of Fig. 1. Fig. 3 represents a plan view of my device having a portion thereof removed for clearness of illustration. Fig. 4 represents a sectional elevation of a portion of my device. Fig. 5 represents a perspective view of a portion of the fly wheel, showing the manner in which the I-beams are secured to the rim casing member.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates a hub which in the present instance I have shown as comprising a plurality of segments in order that the same may be suitably attached to the engine shaft without removing the latter from the pillow blocks which would be necessary if the hub were constructed of a single piece of material. This hub is preferably made of steel or iron forging, pressed steel or cast iron and is provided on its circumference with reinforcing flanges or lugs 2, as indicated most clearly in Fig. 4, there being an annular space 3 between said flanges, said lugs or flanges having recesses 4 therein in which are adapted to be seated I-beams, tubes or plates 5.

6 designates suitable fastening devices such as bolts and nuts, said bolts passing through the reinforcing flanges or lugs carried by the hub and through the inner ends of the I-beams 5, which are seated in the recesses 4. If steel I-beams are employed the number and size thereof depends upon the weight which is to be supported and the tension and strain to which the fly wheel is to be subjected. The beams, plates or tubes forming the spokes of the fly wheel are secured at their outer ends to the rim casing-members 7 which are composed of a number of rectangular-shaped boxes constructed of a suitable thickness of steel, iron or other plate, the bottom plate 8 being curved or deflected to conform to the circumference of the fly wheel which it is desired to construct. If I-beams are employed the same are recessed on one side, as seen at 9, in order that the rim member 7 may be rigidly secured thereto by suitable fastening devices such as bolts or rivets 10.

11 designates the covers or lids for the rim members having flanges 12 through which pass the fastening devices such as screws or equivalent fastening devices 13 which engage the side of the rim members 7. In order to fasten the rim sections in position one or more cords, cables or their equivalents 14 are employed, said cables being slightly less in length than the outer circumference of the rim casing bottom plate 8 and having their ends connected in any suitable manner with

turn-buckles 15 by means of which a sufficient tension may be placed upon the cables to maintain the parts of the fly wheel in position and to lock the different segments together. After the segments have been locked together by means of cables 14 and turn-buckles 15, I secure at a suitable point, either in the bottom or side of the rim casing, one end of a cable 16 made of any suitable continuous material such as chain, metallic bands wire, wire-rope or other suitable material. This cable is then wound around the rim within the hollow casing 7 until a suitable weight is accumulated to form the weighted rim of the fly wheel. The cable is then cut off and the end thereof suitably fastened to the rim casing. If it is desired to vary the weight of any section of the rim in order to counter-balance the weight of the crank shaft it can be accomplished by securing the ends of the wire, rope, chain or other cable to a hollow pipe or box 17 in any desired manner. The length of these pieces of pipe or hollow members may be varied according to the requirements of the case so that the weight of the rim at any desired point may be varied as desired. After the free end of the cable has been secured in place by any suitable means, the lid, rim or cover 12 is placed in position and secured to the casing by means of suitable fastening devices such as screws 13. The different segments are preferably arranged so that they overlap each other, in order that the different sections of the wheel may be more firmly locked together after the cable has been placed in position. In case a suitable cable such as wire, rope or chain is not obtainable the hollow rim casing member may be filled with concrete, castings, iron borings, sand or other heavy material by pouring the same therein after which the top lid member is fastened in position.

If desired the hub sections may be provided with flanges 18 through which pass fastening devices such as bolts or equivalent devices 19.

It will be apparent that in my novel construction the distribution of a greater weight to the rim is permitted since the spokes and hubs, although lighter in weight, are stronger than in the ordinary cast iron construction employed and there will always be more spring or elasticity to take up the shock or vibrations than is present in a rigid cast iron fly wheel. It will be further apparent that in case all the spokes collapse or the hub breaks that a fly wheel constructed according to my invention cannot fly apart, burst or get away from its shaft and pit owing to the manner in which the continuous cable is attached thereto, which renders the fly wheel much safer than the construction ordinarily employed and prevents the possibility of accident or destruction of property such as often occurs from this cause.

It will further be apparent that an engine having a fly wheel embodying my invention may be driven with safety at a much greater speed than is permissible in the ordinary cast iron construction employed and for this reason a greater horse-power may be developed. It will further be apparent that my invention in its broad scope consists of a fly wheel composed of interchangeable segments, tension means for maintaining said segments in assembled position a hollow rim member adapted to be filled with my solid or continuous material and suitable supporting members such as I

or other beams suitably secured to a hub member and rim member, the shape of these beams varying according to the conditions and requirements of the case.

It will now be apparent from the foregoing that I have in the present instance produced a novel and useful construction of an engine fly wheel which embodies the features of advantage enumerated in the statement of invention and the above description and I have in the present instance shown and described the preferred embodiment thereof. It will be further apparent that it may be desirable in some instances to employ angle-irons or the like for side braces, in order to increase the strength of the wheel.

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

1. In a fly wheel, a hub member, a rim member carried thereby and comprising a series of separate boxes having curved bottoms, tension means for preventing improper movement of said boxes and a continuous cable wound upon itself within said boxes to form a weighted rim.
2. In a sectional fly wheel, hub members, hollow rim members suitably secured thereto, tension means within said members for securing said members in assembled position, and a cable wound within said rim member.
3. In a fly wheel, a hub member, spokes secured thereto, hollow rim members secured at the outer ends of said spokes, tension means within said members for securing said rim members in assembled position, and a filling for said rim members.
4. In a fly wheel, sectional hub members having a plurality of flanges extending therefrom, spokes secured to said flanges, a hollow rim section secured at the outer ends of said spokes and a filling material within said sections to form a weighted rim.
5. In a fly wheel, a hub member having a plurality of apertured flanges extending therefrom, spokes secured in said apertures, sectional rim members forming a hollow casing carried by said spokes, a tension device for securing said casing in assembled position and a filling material carried by said casing.
6. In a fly wheel, a hub member, spokes secured thereto having recesses at their outer ends, hollow rim members secured in said recesses, and tension means within said hollow rim members for securing the parts in assembled position.
7. In a fly wheel, hub members, spokes radiating therefrom, sectional hollow rim members carried by said spokes, a fastening member within said rim member for securing the parts thereof in assembled position, means for increasing the tension of said fastening members and a cable wound around said rim member to form a weighted rim.
8. In a fly wheel, a hub member having flanges thereon provided with recesses, spokes secured within said recesses, sectional rim members carried by said spokes, one or more members of less length than the inner circumference of said rim members and tension means engaging the ends of said members for maintaining the parts in assembled position.
9. In a fly wheel, a hub member having apertured flanges, spokes secured in said apertures, a hollow rim member carried by said spokes, one or more members adapted to lock the rim members in position, a tension device for said members and a filling material within said rim members.
10. In a fly wheel, a hub member, spokes secured thereto and radiating therefrom, sectional hollow rim members having a removable cover carried by said spokes, means for engaging the bottom of said rim members for securing the same in assembled position and a cable wound upon itself within said rim member for producing a weighted rim.
11. In a fly wheel, a hub member, spokes radiating therefrom, a hollow rim member carried by said spokes, means engaging the bottom of said rim member for securing the same in assembled position, a cable wound within said rim member to form a weighted rim and means having a different weight than said cable secured thereto to vary the balance of the fly wheel.

12. In a fly wheel, a hub member, I-beams secured there-
to, hollow rim sections secured at the outer end of said
I-beams, means engaging said rim sections for securing the
parts in position, a cable within said rim member for in-
5 creasing the weight thereof, and means within said rim
member for varying the counterpoise of the fly wheel.

13. In a fly wheel, a hub member, spokes radiating there-
from, a hollow rim member carried by said spokes, means
within said hollow rim member for securing the same in

assembled position, a cable wound within said rim member 10
to form a weighted rim, and a member having a different
weight than said cable secured to the latter to vary the
balance of the fly wheel.

GEORGE W. SCHULTZ. [L. S.]

Witnesses:

FRANK SMITH,

C. R. KENNEDY.