(No Model.) 2 Sheets—Sheet 1.

H. E. CAMPBELL & T. E. MURRAY.

FLY WHEEL.

No. 589,558. Patented Sept. 7, 1897.

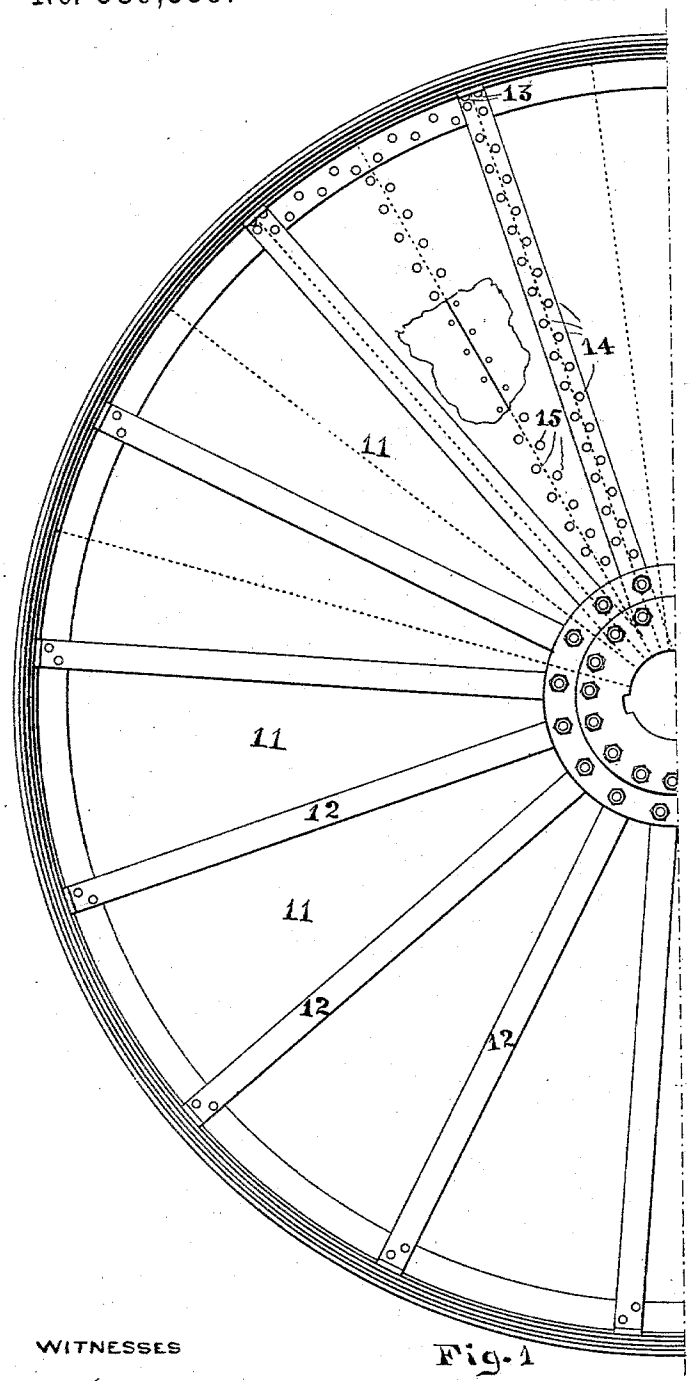


Fig. 1

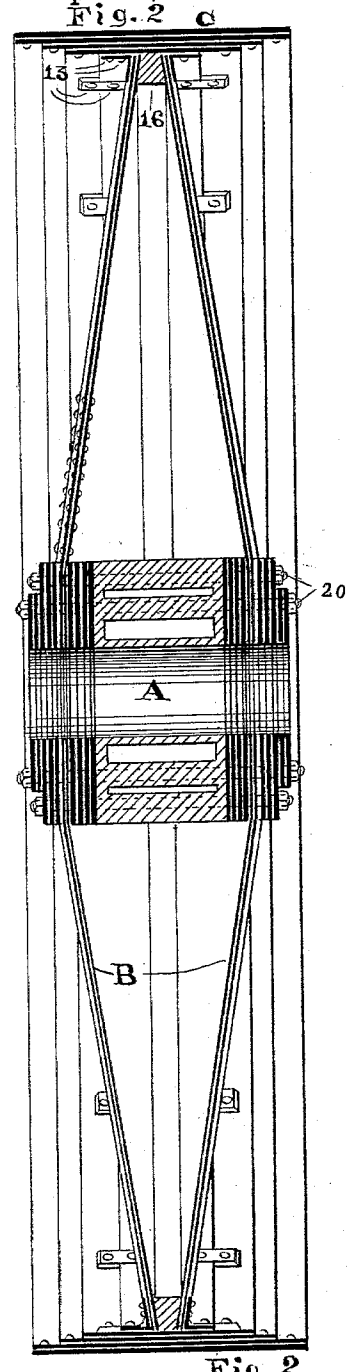


Fig. 2

WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

H. E. CAMPBELL & T. E. MURRAY.

FLY WHEEL.

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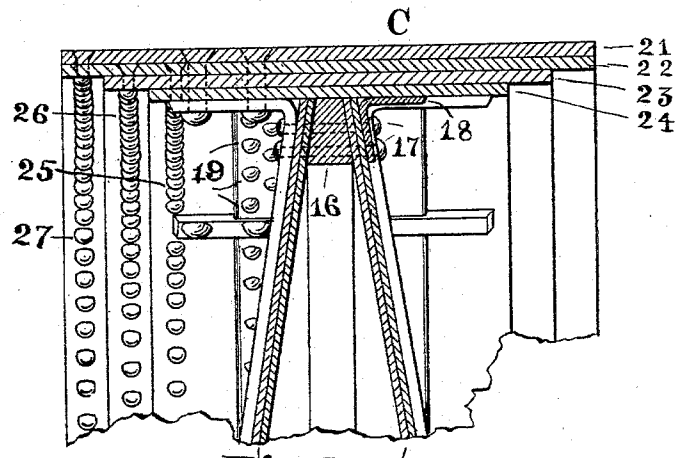


Fig. 3

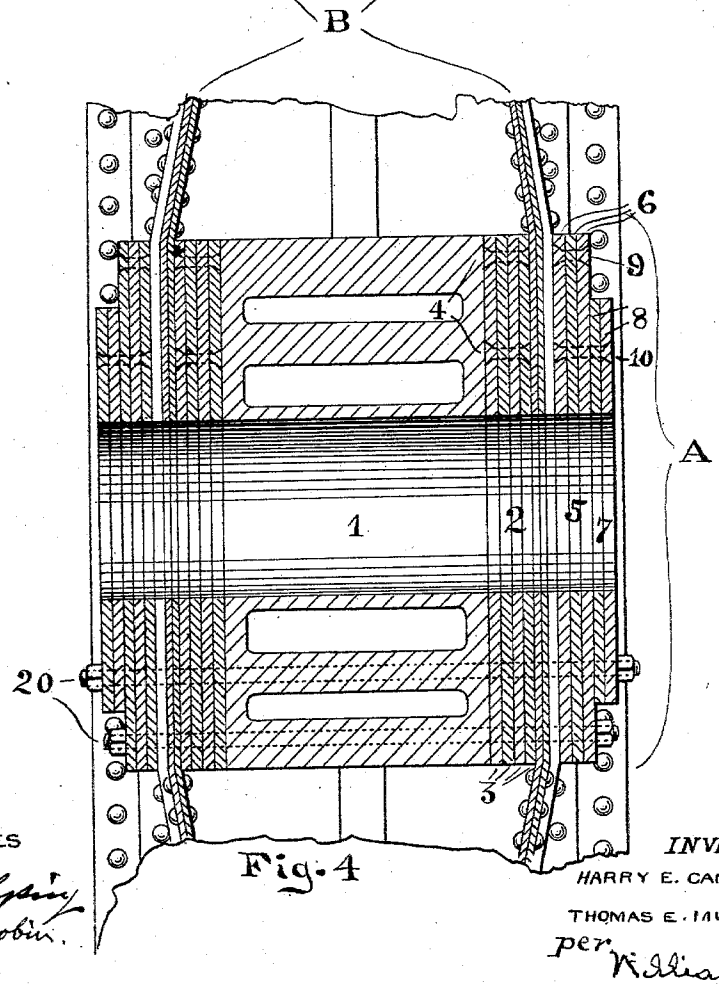


Fig. 4

WITNESSES

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UNITED STATES PATENT OFFICE.

HARRY E. CAMPBELL AND THOMAS E. MURRAY, OF ALBANY, NEW YORK.

FLY-WHEEL.

SPECIFICATION forming part of Letters Patent No. 589,558, dated September 7, 1897.

Application filed May 18, 1896. Serial No. 591,995. (No model.)

To all whom it may concern:

Be it known that we, HARRY E. CAMPBELL and THOMAS E. MURRAY, of Albany, in the county of Albany and State of New York, have invented new and useful Improvements in the Construction of Fly-Wheels, of which the following is a specification.

Our invention relates to improvements in the construction of fly-wheels and pulleys, but especially to such wheels and pulleys that are required to revolve at an exceedingly high rate of speed; and the object of our invention is to construct such wheels and pulleys in such manner that the distribution of the metal will insure a maximum degree of strength to restrain and overcome the tendency of the strain of a centrifugal force of a high-rate revolving wheel to produce a disruption of said wheels and pulleys, and thereby we provide a remedy for the occurrence of many of the serious accidents that have occurred from the disruption of cast-metal fly-wheels while used on high-speed steam-engines.

In the accompanying drawings, which are herein referred to and form part of this specification, Figure 1 is a side elevation of one-half of a fly-wheel in which our invention is embodied; Fig. 2, a central vertical section of the same; and Figs. 3 and 4, enlarged vertical sections of the hub and rim of said wheel, showing details of construction.

As a preliminary to the description of our invention it should be understood that our wheels are mainly constructed of steel plates having great tensile strength, and the parts are formed and secured together substantially as herein described.

As represented in the drawings, A designates the hub of our fly-wheel. Said hub is preferably composed of a cast-metal sleeve 1, of a tubular form, an inner annulus 2, composed of several plates 3 of sheet metal, whose outer diameter is preferably conformed to the diameter of the sleeve 1. Said plates are secured together by rivets 4, which are finished to a plane with the faces of said annulus. An intermediate annulus 5 is formed of plates 6 of sheet metal, which correspond to the plates 3, and an outer annulus 7, composed of plates 8, whose outer diameter is preferably made less than the diameter of the plates 6. The latter are secured together by rivets 9, which only pass through the plates 6, and by rivets 10, which pass through the plates 6 and 8, all of said rivets being finished flush with the face of the plate where said rivets terminate. The annuli 7 form the outer ends of the hub A, and all the annuli and the sleeve 1 should be bored to properly fit upon the shaft on which it is to be secured.

B designates disks or centers by which the hub A is connected to a rim C, which forms the driving portion of the wheel. Said disks are usually made dishing, as shown in Figs. 2, 3, and 4, and the hollow sides of said disks are arranged to face each other, as shown in the drawings, for the purpose of imparting greater stability to the wheel. The disks B are formed of sector-shaped plates 11 of sheet metal, which are arranged in such manner that an angular edge of one plate will abut against a corresponding edge of an adjoining plate, a sufficient number of said plates being provided to complete a circle of the required size, the smaller end of the sector being removed to afford sufficient room for the shaft to pass through the center of the wheel. As shown in the drawings, each disk B is composed of two thicknesses of sector-shaped plates, which are so arranged that the joint between the edges of the inner plates will be at or near a central radial line of the outer plates, as indicated by dotted lines in Fig. 1, in which a portion of an outer plate is broken out to show the joint between two of the inner plates. By this arrangement the outer and inner plates will alternately form break-joints for the inner and outer plates.

The narrower end of each sector-shaped plate is bent to a plane that follows the plane of the annuli 2 and 5, as shown in Fig. 4, so that said plates will fit between said annuli. Over the joint between each of the outer sector-shaped plates a joint-plate 12 is arranged to form a break-joint. The inner end of each joint-plate 12 is bent to conform to the plane of the annuli 2 and 5, and the outer end of each of said joint-plates is bent to conform to the inner side of the rim C, to which it is secured by rivets 13, which pass through said rim and are finished flush with the outer face of the rim. Said joint-plates are secured to the outer sec-

tor-shaped plates by rivets 14, which are preferably arranged in staggered rows, as shown in Fig. 1. The intermediate joints between the adjoining edges of the inner sector-shaped plates are secured by rivets 15, which are arranged in staggered rows and pass through the outer sector-shaped plates. A filling-ring 16, which is interposed between the outer edges of the two disks B, is secured to the latter by rivets 17, which also pass through angle-bar segments 18, and are also secured to the rim C by rivets 19, whose outer ends are finished flush with the outer face of the rim C. The several annuli 2, 5, and 7, the inner end of each sector-shaped plate 11, and the inner end of each joint-plate 12 are secured to the sleeve 1 by means of bolts 20, which pass through all of said parts, as shown in Figs. 2 and 4.

The rim C is composed of a series of plates 21, 22, 23, and 24, formed in segmental sections, which are bent to required curvature. The outer section is composed of plates 21, which have the full width of the rim C. The second section is composed of plates 22, which also have the full width of the rim C, but are made slightly shorter than the plates 21, so that the outer section will fit upon the outer side of the second section. The third section is composed of plates 23, which are preferably narrower than the width of the rim C and are sufficiently shorter than the plates 22 to compensate for the difference in the diameters of the two sections, and the fourth section is composed of plates 24, which are preferably made narrower than the plates for the third section and sufficiently shorter than the last-named plates to compensate for the difference in diameters of two last-named sections. The abutting ends of the several plates of each section are arranged to break joints with like ends of the plates of the other sections, and thereby the greatest degree of strength in such a structure will be obtained. The plates 22, 23, and 24 are first secured together by rivets 25, whose outer ends are finished flush with the outer face of the plates 22. The plates 22 are then secured to the outer face of section 3 by means of rivets 26, whose outer ends are finished flush with the outer face of the plates 22, thereby completing the second, third, and fourth sections of the rim C, and, finally, the plates 21 are secured to the outer face of section 2 by means of rivets 27, whose outer ends are finished flush with the outer face of the rim C, thereby completing the latter with an unbroken outer face, upon which, if the several plates are bent to a proper curvature, a driving-belt will run with accuracy.

We do not limit ourselves to the exact number of sections herein described as forming the rim of our wheel, for it is obvious that the number of said sections can be either increased or diminished, as circumstances may require.

What we claim as our invention, and desire to secure by Letters Patent, is—

In a fly-wheel or pulley, disks, B, composed of sector-shaped plates of wrought metal, and having joint-plates, 12, secured over the joints between said sector-shaped plates and to the hub A and rim C; said disks having a dishing form and being secured together so that their hollow sides will be faced toward each other, as herein specified.

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THOMAS E. MURRAY.

Witnesses:
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F. W. HORROBIN.