(No Model.)

3 Sheets—Sheet 1.

A. H. EMERY.

BELT FLY WHEEL.

No. 496,556. Patented May 2, 1893.

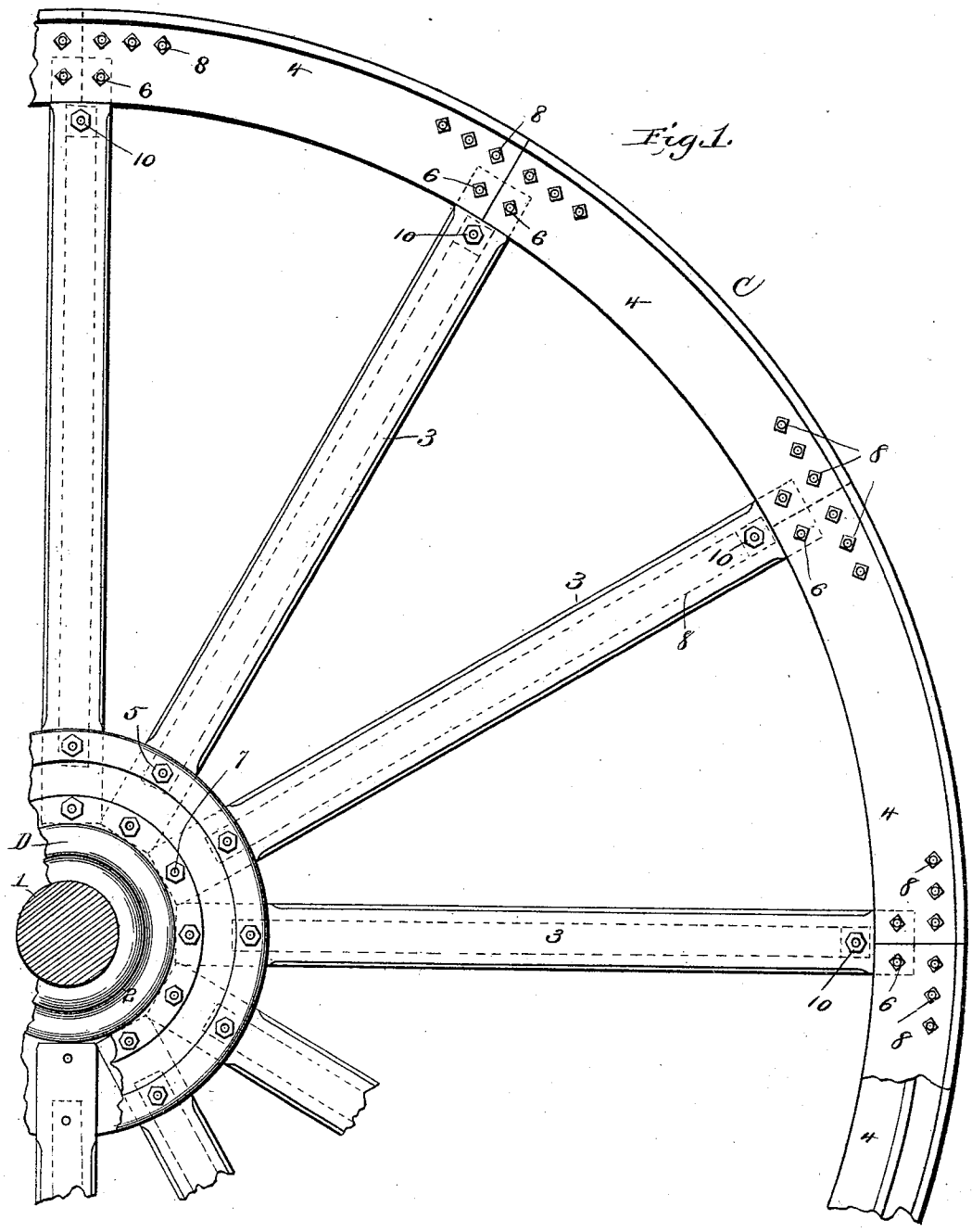

Fig. 1.

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(No Model.)

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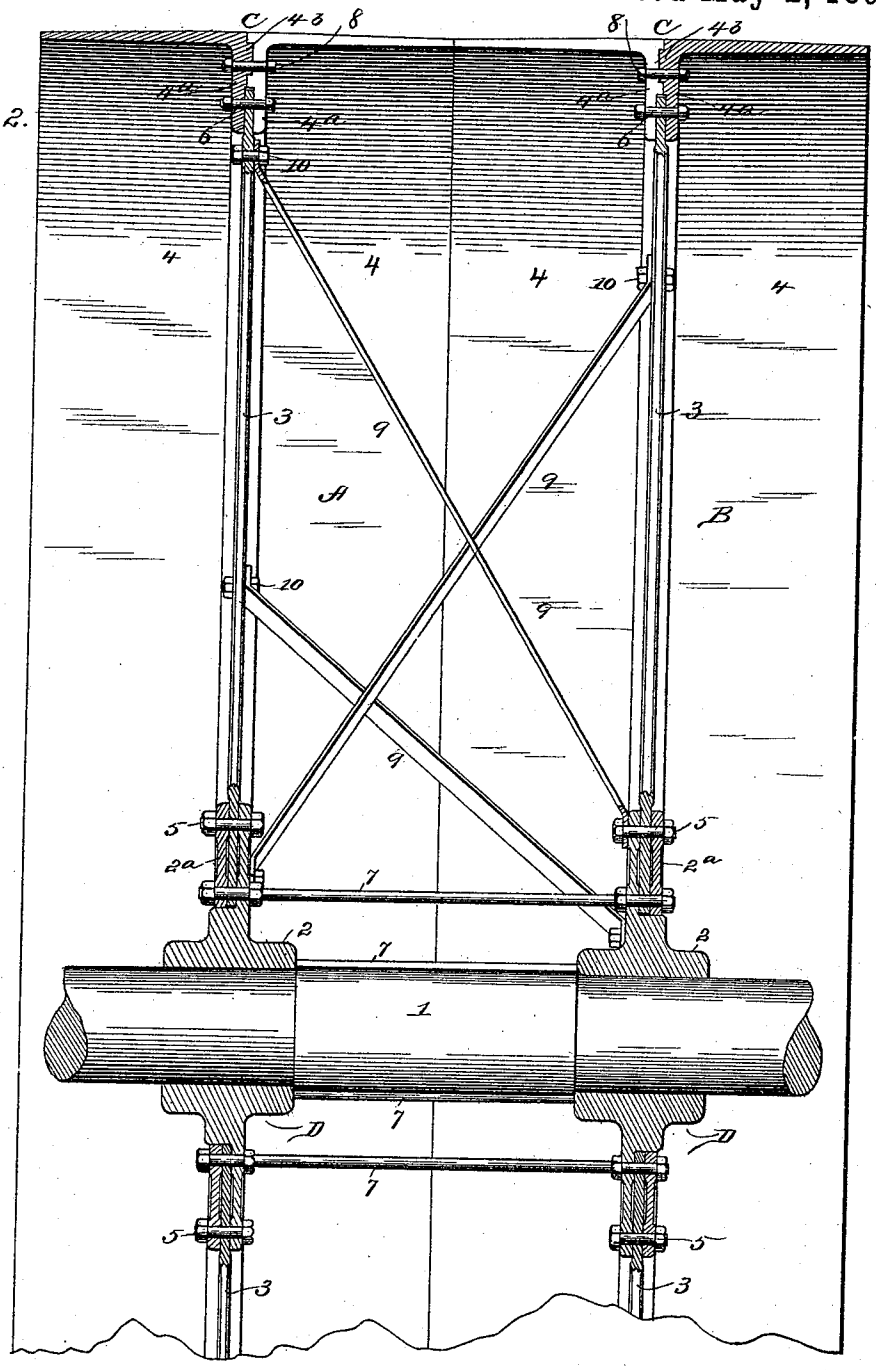
Fig. 2.



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3 Sheets—Sheet 3.

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BELT FLY WHEEL.

No. 496,556. Patented May 2, 1893.

Fig. 3.

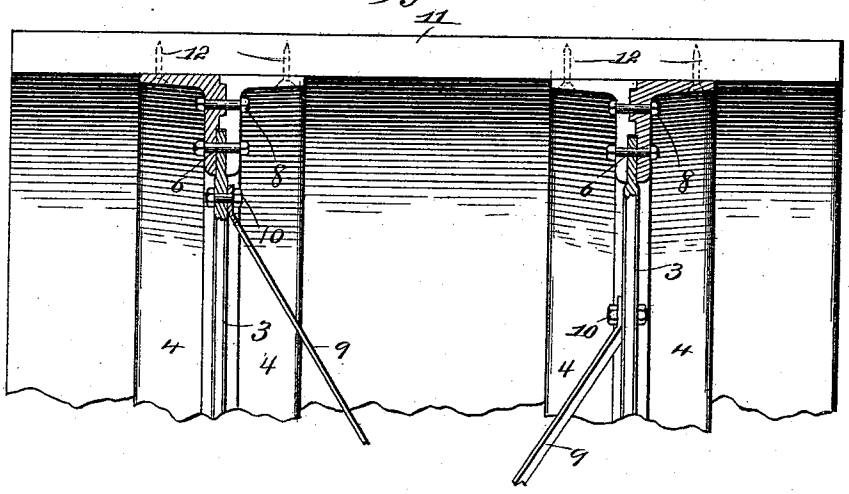
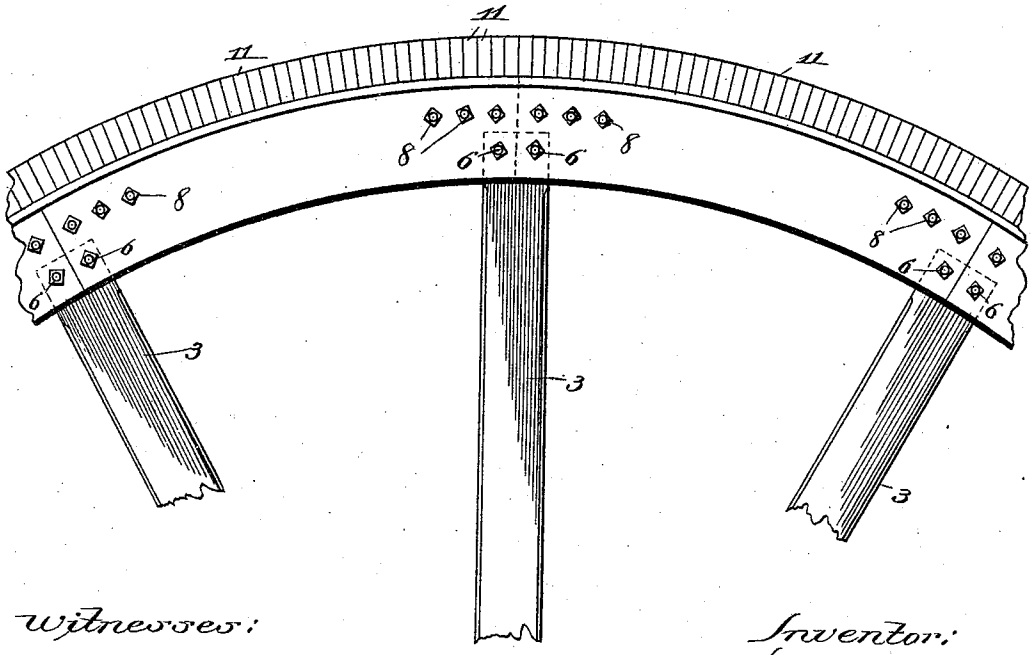


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALBERT H. EMERY, OF STAMFORD, CONNECTICUT.

BELT FLY-WHEEL.

SPECIFICATION forming part of Letters Patent No. 496,556, dated May 2, 1893.

Application filed August 4, 1892. Serial No. 442,170. (No model.)

To all whom it may concern:

Be it known that I, ALBERT H. EMERY, a citizen of the United States, residing at Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Belt Fly-Wheels, of which the following is a specification.

The object of my invention is to produce a large and powerful fly-wheel with comparatively small weight of hubs and arms with a rim which, without being unduly heavy, is of sufficient weight to have the required momentum, the structure of the arms and rim being such as to offer little resistance in their passage through the air. The rim is constructed without the radial flanges, longitudinal with the axis, heretofore used in built up metal pulleys for partially or wholly securing the parts together, which would give great air resistance, and is built up in parts convenient to manufacture, and so formed and assembled as to be easily able to bear all centrifugal and other strains which will be brought upon them in use when run at the highest speeds desirable. This rim is divided transversely to the axis into two main halves, each of which has a strong inwardly projecting circumferential flange on its inner side, and these flanges abut each other. These flanges are usually made in one with the rim portions though they might be made separately and riveted thereto. These two main halves, with the inwardly projecting circumferential flanges are matched and bolted together, forming one main rim with a central flange of sufficient depth and thickness to withstand with ease and safety the transverse loads put upon the rim at the highest speeds of rotation by the centrifugal force in the rim and the radial strains in the arms in their act of confining the rim to the hub. For convenience of construction these two circular halves of the rim are each cut into two or more equal segments. In the drawings they are shown cut into six equal parts, the parts of one half the rim overlapping the corresponding parts of the other half of the rim, the ends of the members of one half being at the middle of those of the corresponding half. The radial arms connect the end and middle of each of these pieces of the rim to the hub and at each joint of the arms and rim one half of the rim is uncut. This method of construction makes it possible to construct the rim with the necessary transverse and tangential strength much lighter than it could be made if both parts of the rim were cut at the same points. The two halves of the rim as well as the parts of each half are secured together and to the arms of the wheel wholly by bolts longitudinal with the axis, instead of longitudinal and tangential bolts, as in the ordinary construction.

In case the rim is very wide, in proportion to the diameter, I prefer to make two complete rims each constructed in the manner above described and having an independent hub and set of connecting arms. When two or more wheels are united in this manner, to form one, the arms may be made very thin and longitudinal steadiness given to the whole structure by a light set of diagonal braces which connect the wheels after they are assembled on their shaft, as will hereinafter more fully appear.

My invention consists in further details of construction and will be hereinafter more fully described with reference to the accompanying drawings, in which:—

Figure 1 represents in side elevation, a portion of the wheel constructed in accordance with my invention, and Fig. 2 is an axial section showing two wheels constructed in accordance with my invention and united upon the same shaft to form a single wheel of greater width. Figs. 3 and 4 are detail views corresponding to Figs. 2 and 1 respectively showing a modified construction, employing a supplementary rim of wood.

A and B represent two wheels, having rims C and hubs D, mounted upon a common shaft 1.

2 represents the main part of each hub.

3 are arms which are secured to the hubs by the bolts 5 and 7 which pass through the flanges of the hub 2 and the removable rings 2^a. The arms 3 are secured to the rims C by bolts 6 longitudinal with the axis, which not

only secure the rims to the arms, but secure the members of the rim together against tangential strain at their ends, the flanges 4^a of the rim C being recessed accurately to permit the ends of the arms 3 to fit tightly in the rim. One of the two flanges 4^a should have a tongue 4^b tightly fitting a groove in the corresponding flange 4^a, the flanges being thus doweled together, as shown. This manner of matching the parts together strengthens the rim and aids in constructing and assembling the wheels. The two ends of the members of the rim are still further secured together against tangential strain as well as longitudinally, by the dowel bolts 8, which pass through their ends and the middle of the opposite member, thus giving, at that point, the whole section of one half of the rim to carry the tangential strain produced by the centrifugal force in the rim. The cross section of each member 4 of the rim C has the metal so distributed as to be thinner at its outer edge and gradually thickened toward the central stiffening rib or flange, being of sufficient thickness all the way to avoid breaking it.

In cases where it is desired to use a wooden surface instead of a steel or an iron one, for the bearing of the belt, the construction shown in Figs. 3 and 4 may be used. In this case the members 4 are made narrow, as shown in Fig. 3, to reduce their weight, but their section is such as to give the required stiffness. They are covered on their exterior by the lag-pieces 11, which are secured to them by the bolts or screws 12. The lag-pieces 11 should be made from one and one-half to two inches thick, and four to six inches deep or deeper, if very long, their depth being sufficient to avoid injury from transverse loads produced by centrifugal strains. They should fit each other on their radial faces, their exterior faces being dressed by turning after they are all secured in position on the wheel. The arms 3, for lightness and strength, are preferably made of rolled steel bars, their width being sufficient to properly position the bolts 6 in the ribs 4^a, and give sufficient transverse strength to avoid injury in stopping and starting the wheel. The thinner the arms are, the less their resistance will be in passing through the air, but they must be thick enough to give the requisite longitudinal steadiness to the wheel, unless the diagonal braces 9 are used. The edges of the arms and the edges of the longitudinally stiffening braces 9, when used should be somewhat rounded to reduce their air friction. These braces are secured in position either by the bolts 5 and 6 at their respective ends or by the bolts 5 and 10, the latter being shown. The arms 3 may be sufficiently secured to the rim by two bolts 6 in each arm and by two or more bolts 5 and 7 positioned as shown in the hub. All the bolts 5, 6, 7 and 8 should be tight fitting and reamed to position. The main body 2 of the hub D is best made of steel and securely pressed to position on the shaft of a tightly fitting taper seat. It may readily be secured in position by the friction of this binding pressure without the use of keys which injure the shaft to a greater or less extent as well as add to the cost of construction. It is especially desirable to fasten the hubs by pressure instead of the keys where two hubs are used as shown in the drawings, where they may be drawn to position and secured there by the bolts 7, aided, if need be by blows or other pressure in assembling.

Instead of making the strengthening ring 2^a as shown, it may be made in one with the hub 2, in which case the hub should be divided transversely to the axis at or near its center and the parts doweled or matched together.

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

1. A plain-faced fly-wheel comprising two main halves, divided circumferentially, each having a wide rim portion and a deep circumferential stiffening and supporting flange on its inner side, said flanges abutting, and each half divided into two or more segments which break joints with and overlap the corresponding parts of the other half, said halves being secured together, substantially as described.

2. A plain-faced fly-wheel comprising two main halves divided circumferentially, each half having a wide rim portion and a deep circumferential stiffening and supporting flange on its inner side, said flanges abutting, and each half divided into two or more segments which break joints with and overlap the corresponding parts of the other half, said segments being joined together and to the hub by a series of arms secured to the hub and bolted to the ends of the segments all substantially as set forth.

3. A plain-faced fly-wheel constructed with two main halves, each having a wide rim and a deep circumferential stiffening and supporting flange on its inner side, said flanges abutting, and each half being divided into two or more segments which break joints with and overlap the corresponding parts of the other half, the inner circumferential flanges being doweled on their abutting faces and secured together, substantially as set forth.

4. A plain-faced fly-wheel constructed with two main halves, each having a wide rim and a deep circumferential stiffening and supporting flange on its inner side, said flanges abutting, each half being divided into two or more segments which break joints with and overlap the corresponding parts of the other half, the inner circumferential flanges being doweled on their abutting faces and secured together at the ends of each segment by dowel bolts passing through the matching dowels, substantially as set forth.

5. A plain-faced fly-wheel comprising two main halves, divided circumferentially, each

having a rim portion and a deep circumferential stiffening and supporting flange on its inner side, said flanges abutting, each half being divided into two or more segments which break joints with and overlap the corresponding parts of the other half to which they are secured, and the lagging strips, secured to the rim by bolts or screws, substantially as and for the purpose set forth.

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