

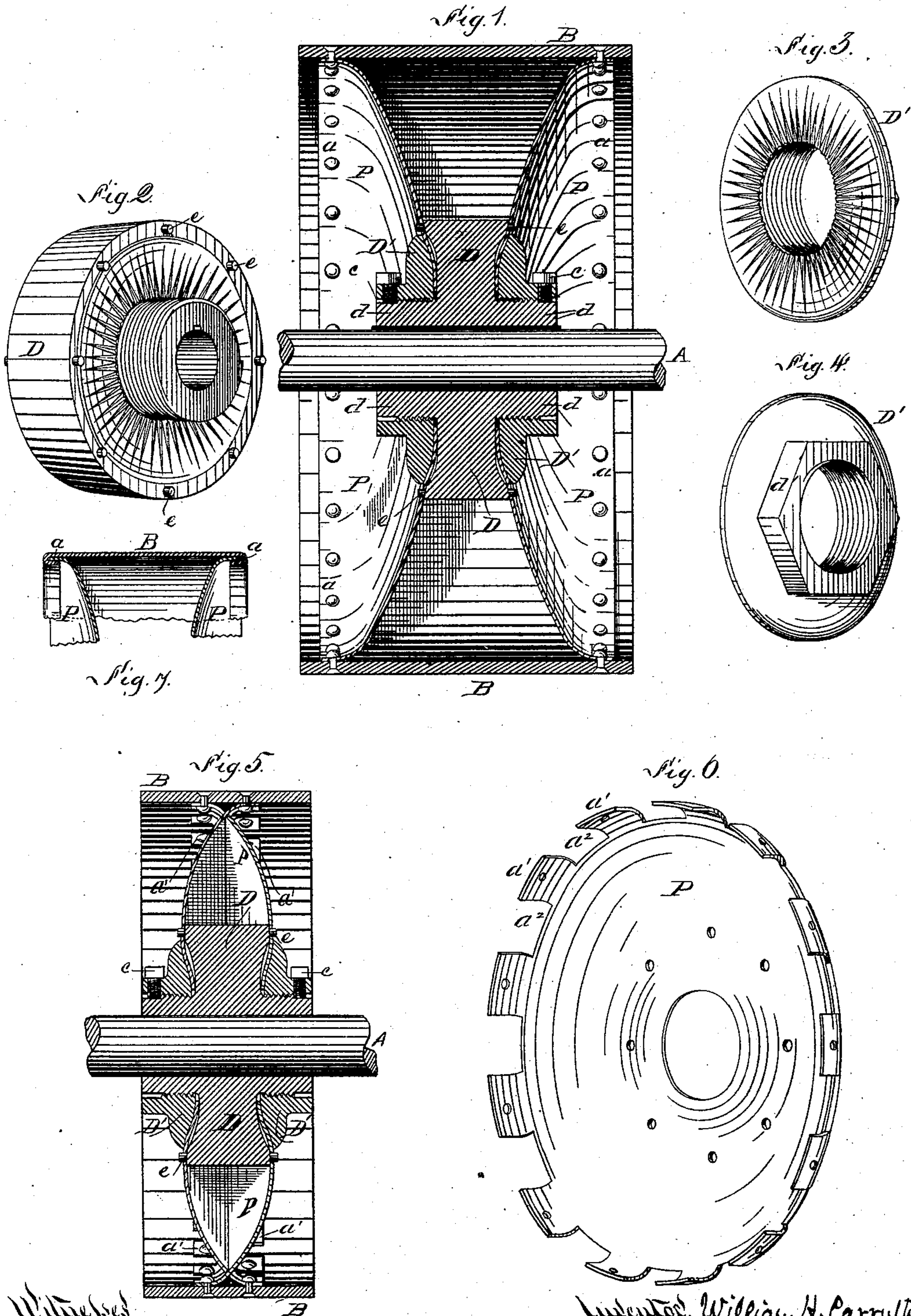
(No Model.)

W. H. CARRUTHERS.

PULLEY.

No. 281,669.

Patented July 24, 1883.



Witnessed  
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# UNITED STATES PATENT OFFICE.

WILLIAM H. CARRUTHERS, OF MOUNDSVILLE, WEST VIRGINIA.

## PULLEY.

SPECIFICATION forming part of Letters Patent No. 281,669, dated July 24, 1883.

Application filed May 21, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. CARRUTHERS, a citizen of the United States, residing at Moundsville, county of Marshall, State of West Virginia, have invented or discovered a new and useful Improvement in Pulleys; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a sectional view of a pulley illustrative of my improved construction. Fig. 2 is a view in perspective of the pulley-hub. Figs. 3 and 4 are perspective views of the clamping-nuts, and Figs. 5, 6, and 7 illustrate the same invention in a somewhat modified form.

The present invention relates to the manufacture of pulleys with two sheet-metal webs interposed between the hub and the rim, and in the preferred construction the webs are made each of a dish shape, and are secured to the hub by clamping and to the rim by riveting. The particular advantages I thus secure are, lightness and cheapness of construction and freedom from the loss by breakage which sometimes occurs, especially in steel or iron casting, from unequal contraction in cooling when the hub and rim and connecting spokes or web are all cast at once.

In Fig. 1, A represents the pulley-shaft, and B the pulley-rim. The latter I prefer to make of wrought-iron or steel, in order to get a smooth and true exterior surface or periphery, and though shown as flat, or of uniform diameter from end to end, it is to be made full around the middle, as is usual in pulley-making. For convenience in working, a low-grade or mild steel had best be employed. The hub consists of a central body, D, and two end sockets, *d*, made with an eye, through which the shaft A passes, and to which latter the hub is secured by a spline or other convenient way. The end faces of the hub-body D are made slightly concave, as shown, or of other suitable shape, with reference to the clamping therein, by screw clamping-nuts D', one on each side of the inner edge of the web-plates P, which plates are made of sheet-iron or sheet-steel of such thickness as will give the de-

sired strength; and to avoid the presence of sharp angular corners, which might be an element of weakness, I prefer to make them concave or dish-shaped, as shown, so that the flange *a*, through which each web is riveted to the rim, may merge by a curve into the body, and so that the center may be clamped, as shown, without danger of breaking the fiber by sharp angles. The webs P may be brought to a dish shape by stamping or spinning, or in other suitable way. The inner or clamping faces of the body D of the hub and the nuts D' may be made with radial corrugations, as shown, the better to take a firm bite on the inner edge of the web so clamped; but I do not regard this as essential, unless it be in pulleys of a comparatively large diameter. The clamping-nuts are made with rectangular ends *d'*, so as to be conveniently screwed up with a wrench, and when screwed up they may be held in place as against any tendency to work loose by means of set-screws *c*; and as an additional means of connecting the central part of the webs P with the hub, and which may be used to the exclusion of the corrugated clamping-surfaces, or may be wholly omitted where not needed, I make dowel-pins *e* on the ends of the hub-body D, near its outer periphery, so that they may pass through correspondingly-arranged holes in the webs, and thereby interlock the hub and webs.

As shown in Fig. 1, the concave or dish sides of the web P are toward the ends of the pulley; but this arrangement of the webs may be reserved, especially in making narrow pulleys, as illustrated in Figs. 5 and 6, where the concave sides of the webs are toward each other, or toward the central transverse plane of the pulley; but when this construction is adopted, in order that the riveting may be done, what would otherwise be the flange *a* is now notched or recessed, as at *a'*, Fig. 6, so that the intermediate parts of the flange, now represented by the projecting ears *a'*, may be slipped past each other—that is, the ears *a'* of one web may pass through a notch, *a'*, of the other web, and thereby facility is given for the work of riveting from the open ends of the pulley. The work, when done, is then substantially as represented in Fig. 5. The notches *a'* may be made deeper, if so desired,



though they will to that extent lessen the strength of the webs; but if a comparatively heavy material be used they will even then be strong enough for most purposes.

5 The principal strains on a pulley when in use, at points intermediate between its hub and rim, are in a radial direction and in the direction of revolution. The curved or somewhat arched shape of the sheet-metal webs P  
10 give one of the best possible dispositions of material with reference to resisting radial compressive strains; and in the circumferential direction, the strains being in the direction of the circumferential planes of the webs,  
15 the latter give the greatest possible resistance thereto which can be secured with a minimum thickness of metal; hence a comparatively light or thin sheet metal can be used with the advantages already referred to.

20 Various modifications may be made, particularly as regards the construction of the hub. At this point any suitable clamping mechanism may be employed. Also, the rim may be made of rolled iron or steel, cut to length,  
25 bent to circular form, and welded or brazed at the ends, and the edges thereof lapped onto and under the flange *a*, so as to make what is known as a "seamed joint," as illustrated in

Fig. 7; or the joint may be otherwise formed, as preferred. Any suitable material may be employed in the hub, though I prefer to use a low-grade cast-steel. The rim B may be of cast metal, if so preferred.

I claim herein as my invention—

1. A pulley composed of sheet-metal webs P, in combination with a hub and rim, substantially as set forth. 35

2. In a pulley, the combination of a metal rim, B, two dish-shaped or concave sheet-metal webs, P, and a clamping-hub, D D', substantially as set forth. 40

3. In combination with the metal pulley-rim B, sheet-metal webs P, and hub D D', the dowel-pins *c*, engaging holes in the web, substantially as set forth. 45

4. The clamping-hub D D', having corrugated clamping-surfaces, in combination with sheet-metal webs P and rim B, substantially as described.

In testimony whereof I have hereunto set my hand. 50

WILLIAM H. CARRUTHERS.

Witnesses:

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L. B. PURDY.