

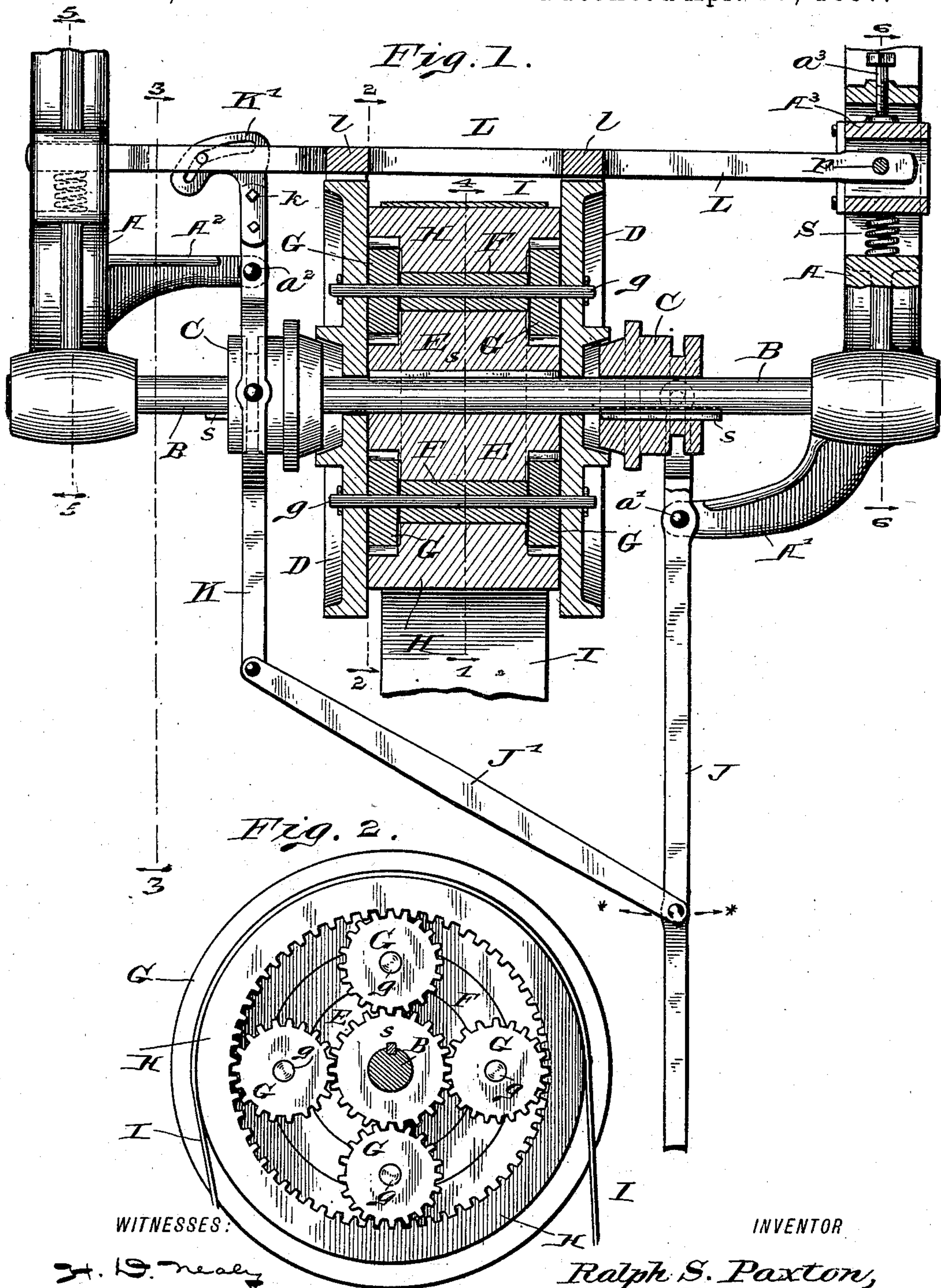
(No Model.)

2 Sheets—Sheet 1.

R. S. PAXTON.  
REVERSIBLE PULLEY.

No. 580,890.

Patented Apr. 20, 1897.



**WITNESSES:**

34. 19. nearly  
J. A. Walsh,

***INVENTOR***

*Ralph S. Paxton,*  
BY  
*Chester Bradford,*  
ATTORNEY.



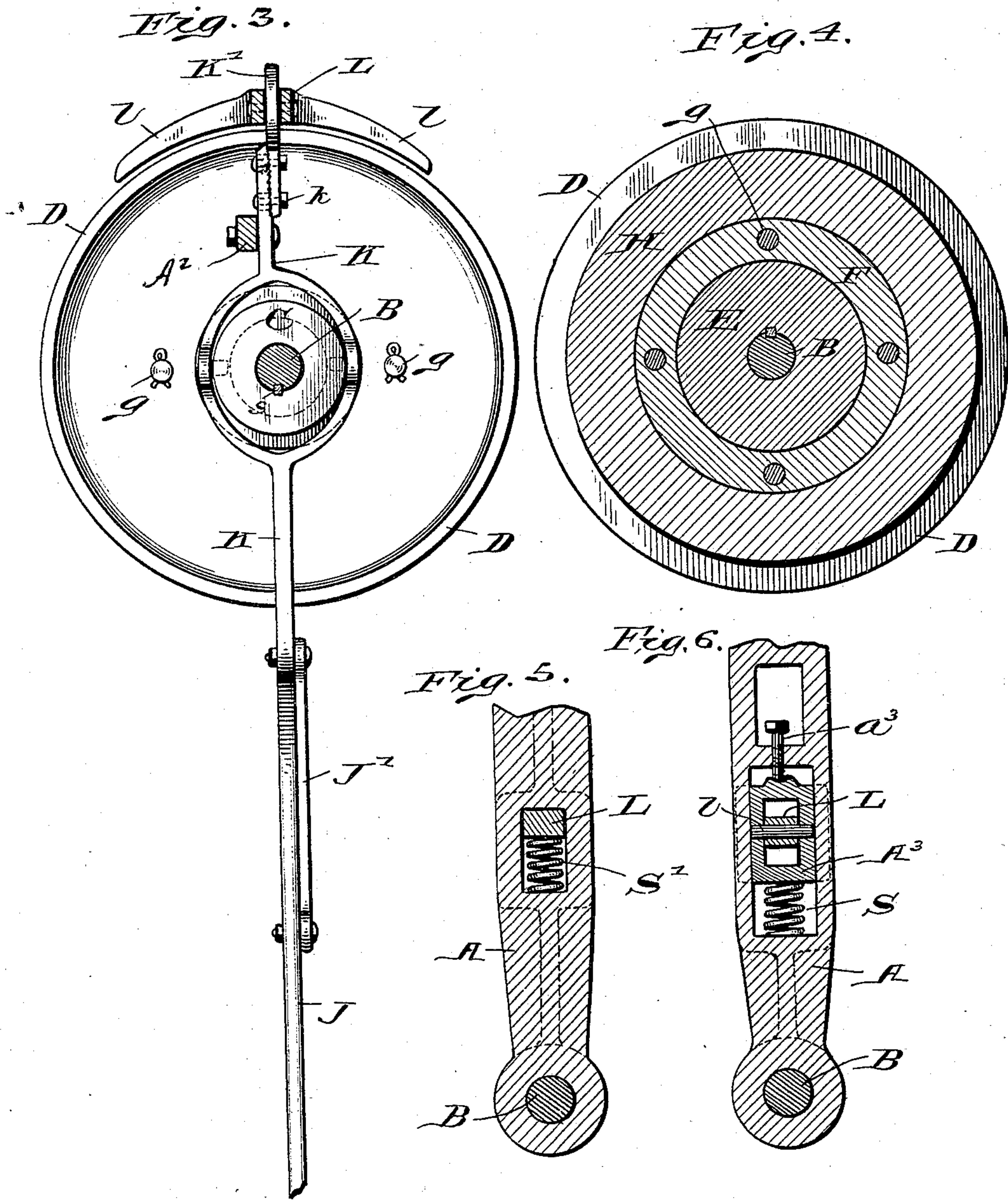
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*H. S. Neely.*  
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*Chester Bradford*  
ATTORNEY.



# UNITED STATES PATENT OFFICE.

RALPH S. PAXTON, OF ARCADIA, INDIANA.

## REVERSIBLE PULLEY.

SPECIFICATION forming part of Letters Patent No. 580,890, dated April 20, 1897.

Application filed September 14, 1896. Serial No. 605,782. (No model.)

*To all whom it may concern:*

Be it known that I, RALPH S. PAXTON, a citizen of the United States, residing at Arcadia, in the county of Hamilton and State of Indiana, have invented certain new and useful Improvements in Reversible Pulleys, of which the following is a specification.

The object of my said invention is to produce a pulley by which a shaft may be driven in both directions, and also be permitted to be at rest, by the use of a single belt, thus obviating the usual triple-pulley and cross-belt arrangement for producing this result. Said invention consists in a pulley consisting of a hub or central portion, an outer or belt-bearing portion or rim, intermediate small wheels which engage with and connect the hub and rim together, and side disks carrying the shafts of said small wheels and which are adapted to be clutched either to revolve with the shaft or to be held stationary while the shaft revolves, or are left free to run loosely, as may be desired. There may also be a central portion intermediate the hub and rim, and through which, when used, the shafts which carry the wheels by which the hub and rim of the pulley are united will pass. Means for throwing the clutches into and out of engagement are also provided, which may be of any suitable form or arrangement, all as will hereinafter be more fully set forth.

Referring to the accompanying drawings, which are made a part hereof and on which similar letters of reference indicate similar parts, Figure 1 is a view, partly in side elevation and partly in section, of a pulley and attachments embodying my invention; Fig. 2, a side elevation of the pulley with one of the side plates or disks removed as seen from the dotted line 2 2 in Fig. 1; Fig. 3, a transverse sectional view as seen from the dotted line 3 3 in Fig. 1; Fig. 4, a central sectional view of the pulley separately as seen from the dotted line 4 4 in Fig. 1; and Figs. 5 and 6, detail views through the hangers and bearings at the respective ends of the structure on the dotted lines 5 5 and 6 6, respectively, in Fig. 1.

In said drawings the portions marked A represent the hangers for the pulley-shaft; B, said pulley-shaft; C C, clutches mounted

on said pulley-shaft, whereby the disks D are clutched to revolve therewith; D, disks loosely mounted on said pulley-shaft and forming the side plates of the pulley; E, the hub of the pulley; F, an annular ring surrounding the hub; G, small wheels mounted in recesses in the sides of the pulley and uniting the hub and the rim; H, said rim; I, the belt whereby the pulley is driven; J, a lever by which the clutch mechanism is shifted; K, a second clutch-lever, and L a bar carrying brakes or clutch-faces whereby the disks or plates D are clutched in stationary position.

The hangers A are in the main of any usual or desired form and are provided with bearings for the shaft B. In the arrangement shown they are so provided with arms A' and A<sup>2</sup>, upon which the levers J and K are pivoted. They are also provided at suitable points with openings to receive the ends of the bar L or bearings and supports therefor, as will be hereinafter more fully explained.

The shaft B is an ordinary shaft and is mounted in suitable bearings in the hangers A or such other hangers or supports as may be provided. It should be key-seated and provided with suitable splines s for the clutches and the pulley-hub, as shown.

The clutches C are of an ordinary and well-known form and are adapted to be shifted longitudinally on the shaft B, so as to either engage with the disks D or to be free therefrom. In Fig. 1 the parts are shown as assembled with all the clutches disengaged, as when the pulley is running idle.

The disks D run loosely upon or around the shaft B and contain bearings for the ends of the shafts g, as shown. They are provided with clutch-faces with which the clutches C may engage, in which case they revolve with the shaft B, and they are also provided with friction or clutch surfaces on the peripheries with which the brake-like clutch-surfaces on the bar L may engage, in which case they are held stationary, so as not to revolve at all. In the one case the shaft, through the medium of the belt and pulley, is driven in one direction, while in the other case it is driven in the other direction, without shifting the direction in which the belt itself runs, as will hereinafter more plainly appear; and when neither



of the clutch-surfaces are in contact, as shown in Fig. 1, the belt may run idly without driving the shaft at all.

The hub E is secured fixedly upon the shaft B. Its ends are turned down and the smaller portions are preferably toothed, so that said ends become gear-wheels, as shown most plainly in Fig. 2.

The ring F is interposed between the hub E and the rim H of the pulley, being supported by the hub and itself supporting the rim. It also serves as a support for the shaft *g*. While I prefer to employ this ring, it is not absolutely essential to my invention, as the shafts *g* are also supported by the disks or plates D, while the rim H may be wholly supported from the hub E through the medium of the gear-wheels G, as will be readily understood. For strength and stability of structure, however, I regard the employment of this ring as of value, and while it may be dispensed with I prefer to use it. If it is dispensed with, the space now occupied thereby would simply become vacant.

The wheels G are mounted on shafts *g*, which are shown as carried by the ring F and the plates D. Said gear-wheels intermesh with the toothed ends of the hub E and the internally-toothed ends of the rim H, with the effect which will be presently described.

The rim H of the pulley is in the form of an annular ring with its ends recessed somewhat and the recessed portions interiorly toothed, as shown most plainly in Fig. 2. This rim immediately carries the belt which drives the pulley structure.

The belt I runs over the pulley structure as usual and drives said pulley from any suitable source of power. (Not shown.)

The lever J is mounted on the pivot *a'* on the arm A' of the hanger A, and, as is usual and as will be readily understood, serves to throw the clutch C from one position to another, as may be desired.

The lever K is carried by the pivot *a''* and operates the other one of the clutches C, and it also extends up and engages with the bar L, whereby the disks D may be clutched in stationary position. The lever K is shown as connected to the lever J by the link J'. Obviously one of the clutches and consequently one of the levers may be dispensed with, if desired; but I prefer to use the two for greater certainty and effectiveness in operating the device. The upper end of the lever K is preferably divided and the extreme upper portion K' rendered adjustable, so that its operation on the bar L may be exactly that desired. Obviously adjustments may be effected by loosening the bolts *k*, moving the part K' slightly, and retightening the bolts, the bolt-holes being formed to permit this. The adjacent surfaces of these parts are preferably serrated, as shown in Fig. 3, to aid in maintaining the parts in rigid relation.

The bar or lever L is pivoted by a pivot *p*

in a bearing A<sup>3</sup>, mounted in one of the hangers A, and extends across and passes into a suitable opening into the other of said hangers. The pivoted end is rendered adjustable by means of the set-screw *a*<sup>3</sup> operating against the bearing A<sup>3</sup>, said bearing being held up against said set-screw preferably by a spring S. The other end of said bar L is also held upwardly by a spring S'. Friction or clutch arms *l* extend out from the bar or lever L and are adapted to come in contact with the peripheral surfaces of the disks D.

The operation of this invention is as follows: When it is desired that the shaft B shall remain idle, the various parts of the device are positioned, as shown in Fig. 1, so that neither of the clutches is in engagement. Obviously, then, the rim H will run idly about the hub E, simply revolving the wheels G in its course. When, however, it is desired that the shaft B shall be driven in the same direction that the belt is running, then the clutches C are thrown into engagement, so that the disks D are clutched rigidly onto said shaft. The entire pulley structure then becomes rigid with said shaft, which is therefore driven in the same manner as a common pulley. When, however, it is desired that the shaft B should run in the reverse direction to that in which the belt is traveling, the clutch arms or faces carried by the bar L are thrown into engagement with the peripheral surfaces of the disks, which are thus locked, so that they cannot revolve at all. The shafts *g* being carried by said disks, (either directly and alone, or with or through the medium of the ring F,) the wheels G are forced to revolve independently of the pulley structure by reason of the engagement of the interiorly-toothed rings forming the extreme edges of the pulley-rim, and as these wheels engage at the opposite points with the toothed ends of the hub, which is secured rigidly to the shaft, manifestly said shaft must be driven in the reverse direction. I thus secure by the use of a single straight belt all the means or conditions heretofore secured by the use of one idle and two tight pulleys with two belts, one straight and one crossed, as will be readily understood. This is of considerable advantage in many places where the matter of room is of consequence, and in all cases it saves not only one of the belts, but the excessive wear incident to a crossed belt. Manifestly, too, any desired change of speed may be secured by varying the sizes of the wheels G and the toothed extensions on the hub and rim of the pulley.

It will be observed that there is no wear or friction between the parts of the structure itself except when the shaft is running backward, when in most machines the driver is relieved of its load and consequently requires but little power. When the shaft is being driven forward, the pulley is to all intents and purposes a solid integral structure operating in the usual manner.



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

1. The combination, in a pulley, of a hub,  
5 a separately-constructed rim, wheels interposed between said hub and said rim and engaging with both, disks alongside the pulley carrying said wheels, and clutches, whereby said disks may be clutched onto the shaft, or  
10 clutched from revolving with the shaft, whereby said shaft may be driven in either direction by the same belt, substantially as set forth.

2. The combination of a shaft, a pulley-hub  
15 rigidly attached to said shaft, a separately-constructed pulley-rim surrounding said hub, wheels interposed between and engaging with

said hub and said rim, disks loosely mounted on the shaft alongside the pulley hub and rim and arranged to drive said wheels, clutches 20 adapted to engage with said disks, one clutch or set of clutches being adapted to lock said disks to revolve with the shaft and the other clutch or set of clutches being adapted to lock said disks from revolving with the shaft, 25 substantially as and for the purposes set forth.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 10th day of September, A. D. 1896.

RALPH S. PAXTON. [L. s.]

Witnesses:

CHESTER BRADFORD,  
JAMES A. WALSH.