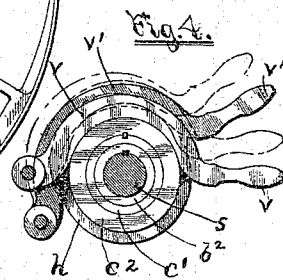
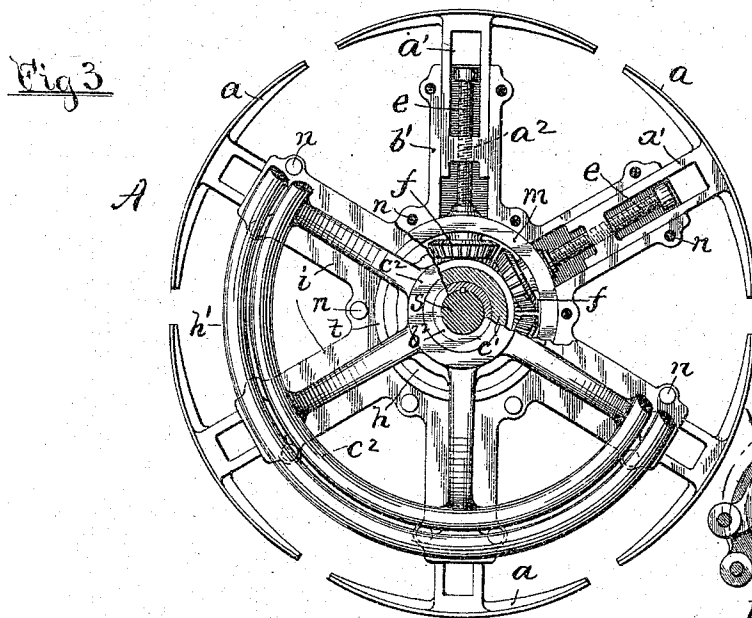
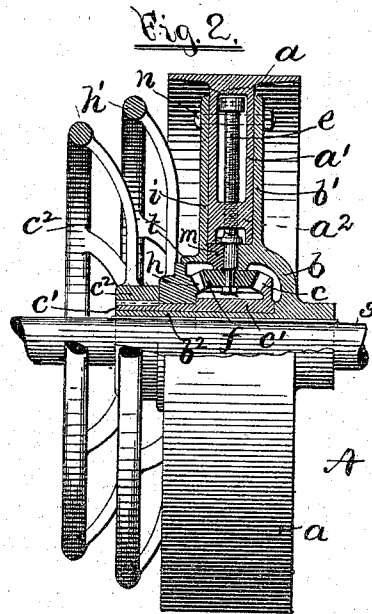
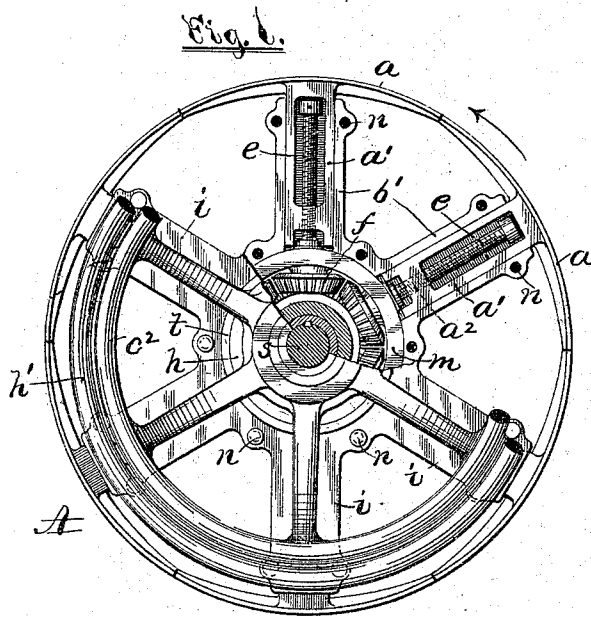


(No Model.)

J. MUIR.
EXPANSION PULLEY.

No. 558,196.

Patented Apr. 14, 1896.



Witnesses.

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UNITED STATES PATENT OFFICE.

JAMES MUIR, OF PROVIDENCE, RHODE ISLAND.

EXPANSION-PULLEY.

SPECIFICATION forming part of Letters Patent No. 558,196, dated April 14, 1896.

Application filed November 22, 1895. Serial No. 569,784. (No model.)

To all whom it may concern:

Be it known that I, JAMES MUIR, a subject of the Queen of Great Britain, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Expansion-Pulleys; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to the class of pulleys in which the rim portions consist of a series of radially-movable sectors; and it consists in the article of manufacture hereinafter described, and set forth by the claims.

The object I have in view is to produce a pulley of the class referred to capable of being easily and readily expanded or contracted while it is in motion and revolving in either direction. In certain kinds of machinery or machines—as, for example, such as are usually employed in paper making and calendering—it frequently becomes necessary to change their speed of rotation during the production of the goods under manufacture, and in order to effect such change in speed the machine may have to be stopped, so that the attendant can make the necessary adjustment of the driving mechanism with safety. Obviously such stopping and starting of the machinery involves the loss of time and product, the latter being more or less injuriously affected thereby.

By means of my improved pulley the speed of the machine driven by it may be changed so as to run above or below the normal speed, as desired, and without first stopping it or even reducing its speed to effect such change.

In the accompanying sheet of drawings, Figure 1 is a front or end view of my improved expanding pulley, the segments or rim-sections contracted to the minimum diameter, portions of the front plates, &c., being broken away. Fig. 2 is a side view in partial section. Fig. 3 is a front view similar to Fig. 1, but showing the pulley expanded; and Fig. 4 is an end view showing a modification of the gear-controlling device.

In the drawings, A indicates my improved expanding pulley complete. It is provided with a center or hub portion *b*, capable of being secured to a shaft *s*. Said hub, as drawn, has a series of six spokes or integral arms *b'* radiating therefrom, in which are movably seated a corresponding series of sector-arms *a'*, these latter carrying at their outer ends the several rim-sectors *a*. The sector-arms or spokes are hollow and are provided centrally at their lower ends with nuts *a*². These latter are radially arranged, each having fitted thereto a screw-threaded spindle *e*. The spindles are non-movable endwise and are mounted in bearings formed in said hub member *b*, and are maintained in place by means of a removable cap-ring *m*. (See Fig. 2.) In order to keep the arms *a'* and said cap-ring in position laterally or longitudinally of the shaft, as well as to protect said members, I provide a flat spider-shaped cap-plate *i*, the whole being secured together by bolts *n*.

The inner or lower ends of the spindles *e* have secured thereto small bevel-gears *f*, one gear to each spindle. Intergearing therewith at the rear side of the pulley is a central gear *c*, the same having an elongated hub *c'*, extending toward the front of the pulley and mounted to turn loosely on the extension *b*² of said hub *b*. A gear *h*, similar to gear *c*, intergears with the front side of the several gears *f*. Said gear *h* is oppositely-arranged with respect to gear *c*, and is mounted to turn loosely on the hub *c'* of the latter. The gear *h* is provided with an enlarged round wheel-rim *h'*, through which the gear may be rotated.

To the front end of the gear-hub *c'* is secured an operating-wheel *c*², also provided with a rim portion, substantially as just stated with respect to gear *h*. The hub of wheel *c*² serves to hold the gear *h* in position laterally. Thus it will be seen that by turning the wheel *c*² in either direction a corresponding movement will be imparted to the gear *c*. The gear *h* may be rotated in like manner by turning the wheel *h'*.

Assuming now the several parts to be arranged substantially as represented in Figs. 1 and 2, the pulley being stationary, and that the spindles *e* are provided, say, with right-hand screw-threads, it will be apparent that

upon turning the wheel c^2 to the right, or in the direction the hands of a watch travel, the gears c and f will cause the spindles to revolve simultaneously toward the left, thereby forcing these several rim-sectors outwardly and expanding the pulley. A reversal of the operation contracts the pulley.

By means of the wheel-rim h' the front central gear h , &c., are employed for expanding and contracting the pulley-rim. In this case, however, the movement of the gear h is reversed with respect to the gear c —that is to say, turning the wheel-rim h' to the left operates to expand the pulley and turning it to the right contracts it.

The principal advantage or utility of my invention resides in the fact that the pulley may be both expanded and contracted while it is revolving in either direction and at any rate of speed. Moreover, the two gears c and h and the corresponding wheel-rims c^2 h' act as a positive check each upon the other automatically to hold the revolving pulley-rim in a locked position after adjustment.

In effecting the adjustment of the revolving pulley A it is simply necessary to hold one of the hand-wheels or rims stationary, or to retard its movement until the desired adjustment is accomplished—that is, suppose the pulley is to be expanded, and assuming it to be revolving in the arrow direction shown in Fig. 1, the operator simply holds the wheel-rim c^2 , thereby causing the spindles to revolve axially, and thus force the rim sectors outwardly to the desired extent. While this is taking place the other wheel-rim and gear h will thereby be accelerated, or, in other words, the speed of the revolving gear h will for the time being exceed the speed of the pulley. The pulley is contracted by holding the wheel-rim h' , whereby the gearing, &c., causes the spindles e to revolve axially in a reverse direction, the rotation of the wheel-rim c^2 and its gear being accelerated in turn. In case the pulley is driven in a reverse direction to that indicated by said arrow in Fig. 1, then in that event the pulley is expanded by holding the wheel-rim h' and is contracted by holding the rim c^2 .

In lieu of holding the wheel-rims and thereby the gears c h by hand, they may be effectually held or checked, while the pulley is revolving very rapidly, through the medium of straps or brakes capable of being brought into frictional engagement with them, substantially as represented in reduced scale in Fig. 4, wherein the said gears are provided with small pulley-like hubs. A pair of suit-

ably constructed and mounted brake-levers v v' are also represented, the same being so arranged with respect to said hubs that they may be readily swung into and out of frictional contact with the hubs, as desired. It is obvious, too, that brake-levers may be employed to frictionally engage the surface of the said wheel-rims c^2 h' without departing from the spirit of the invention.

From the foregoing description it will be evident that by means of my improvement expanding pulleys may be easily and quickly adjusted while they are revolving at any speed and in either direction, the device also forming an automatic locking arrangement for maintaining the rim-sectors in position when adjusted.

While I do not claim, broadly, as my invention an expanding pulley capable of being expanded and contracted while it is in motion,

What I do claim is—

1. In an expanding pulley, the combination of a central hub portion adapted to be secured to a driving-shaft said hub having a series of radial spokes, rim-sectors provided with arms movably mounted in said spokes each having a nut or female screw, a revolvable screw mounted in each of said hub-spokes coacting with said nuts, bevel-gears secured to the inner ends of said screws, a loosely-mounted central gear intergearing with all of said bevel-gears capable of being revolved in either direction, and a central gear oppositely facing the first-named central gear also intergearing with all the bevel-gears and capable of being revolved in either direction at will, substantially as hereinbefore described.

2. In an expanding pulley, the combination with the central or driving member, a series of radially-movable rim-sector members mounted thereon, a series of coacting screws and nuts arranged in said driving and sector members and gears, as f , secured to the inner or lower ends of said screws, of a pair of oppositely-facing loosely-turning central gears, as c , h , in continuous engagement with the adjacent sides of said gears f , and a pair of operating wheels or members secured to said central gears, said operating-wheels being arranged at one side of the pulley and capable of being rotated simultaneously in opposite directions, substantially as set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

JAMES MUIR.

Witnesses:

GEO. H. REMINGTON,
REMINGTON SHERMAN.