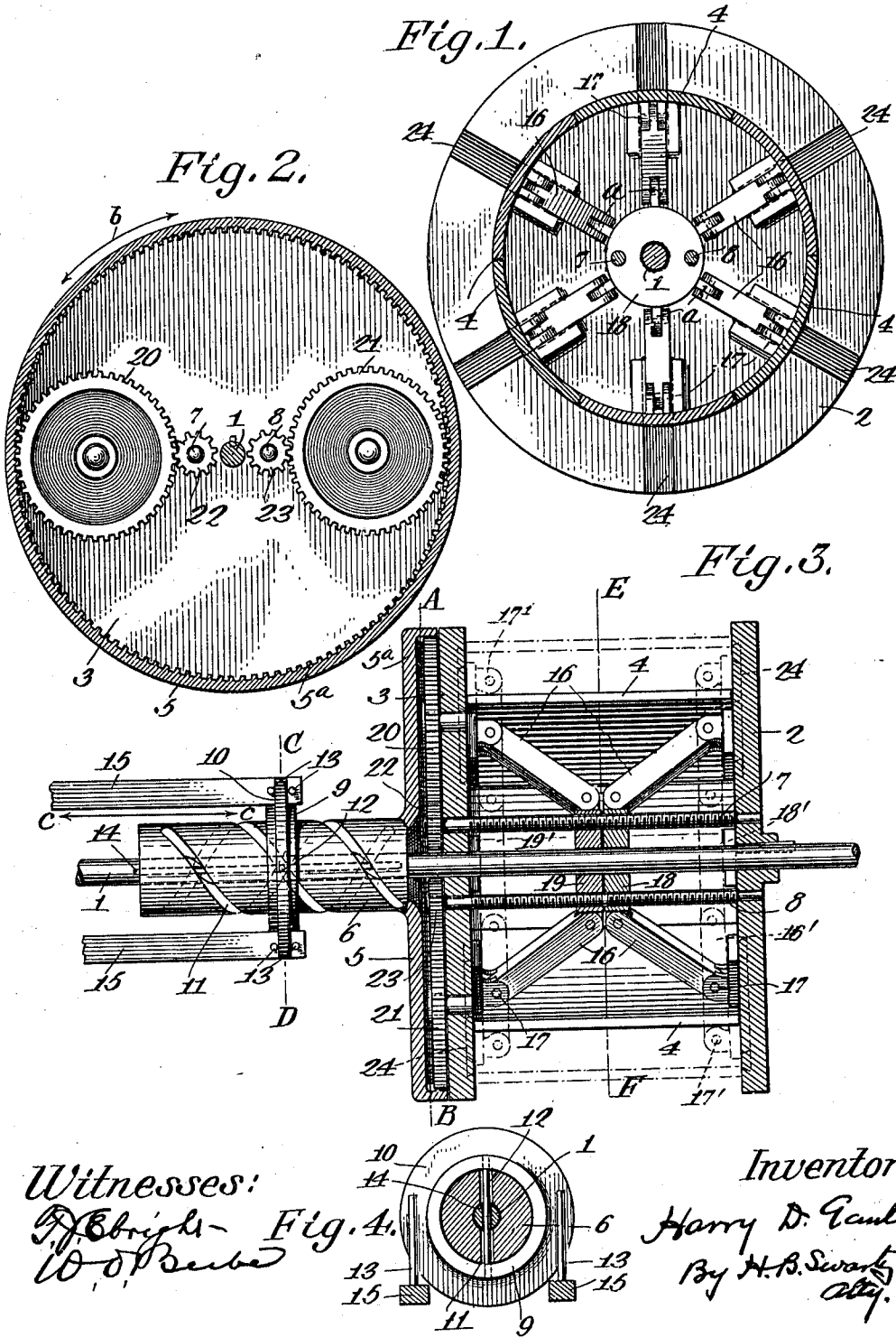


H. D. GAULT.
EXPANSIBLE PULLEY.
APPLICATION FILED AUG. 23, 1909.

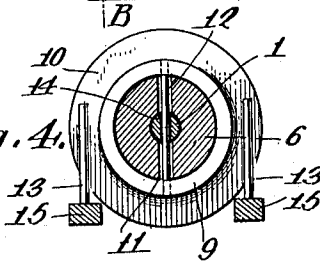
978,285.

Patented Dec. 13, 1910.



Witnesses:

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att'y.

UNITED STATES PATENT OFFICE.

HARRY D. GAULT, OF WOOSTER, OHIO.

EXPANSIBLE PULLEY.

978,285.

Specification of Letters Patent.

Patented Dec. 13, 1910.

Application filed August 23, 1909. Serial No. 514,319.

To all whom it may concern:

Be it known that I, HARRY D. GAULT, a citizen of the United States, residing at Wooster, in the county of Wayne and State of Ohio, have invented a new and useful Expansible Pulley, of which the following is a specification.

My invention relates to improvements in expansible pulleys used for the purpose of varying the speed of machinery. Its objects are, first, to provide improved means for expanding and contracting the diameter of the pulley, and diminishing the friction of the operative elements which are within the body of the pulley; second, to furnish better means than heretofore employed for actuating the said operative elements; and, third, to provide improved means for impelling the actuated parts, regulating their adjustment, and securing them in any desired position and degree of expansion, while the pulley is in motion.

It consists of the novel method of constructing and actuating the said means employed, and in the novel combination of elements employed to accomplish the several objects stated, as will appear in the following description and claims.

My invention is illustrated by the accompanying drawings, in which similar letters of reference indicate like parts.

Referring thereto, Figure 1 is a vertical cross section of an expansible pulley such as I use, on the line E F of Fig. 3. Fig. 2 is a vertical cross section of the same on the line A B of Fig. 3. Fig. 3 is a vertical longitudinal section of my improved pulley through its diameter, showing the several actuating means I employ. Fig. 4 is a vertical cross section of one part of said actuating means on the line C D of Fig. 3.

In the drawings, 1 represents the shaft on which the pulley is mounted. It may be supported upon hangers, (not shown in the drawings) in the usual well known way. The pulley comprises two similar end sections or disks 2 3 rigidly secured upon the shaft in proper relation to each other by any suitable fastenings. Its variable periphery is made up of a series of rim sections or segments 4 which are mounted endwise in radial slots or grooves formed at corresponding intervals along the inner surfaces of said disks respectively, and adapted to move in and out therealong by the action of their related link bars 16 which are pivotally secured there-

to by the ears 17, respectively, as shown in Fig. 3.

I am aware it is not new to construct an expansible pulley with adjustable segments actuated by link bars, and such I do not broadly claim. My improvement in this respect lies in simplifying and making more effective the means for actuating and controlling the said link bars and thereby said segments respectively. I accomplish this by mounting a pair of collars 18 19 upon the shaft 1 between the two end disks 2 3, adapted to slide therealong and rotate with the shaft, and having a series of radial extensions, like spokes, corresponding in number and position with the several pairs of link bars, to the inner ends of which they are respectively pivotally attached, as shown at *a a*, Fig. 2. Said collars are perforated by threaded holes adapted to receive and engage the threaded rods 7 8 which extend longitudinally through the pulley on opposite sides of the shaft 1. For the purpose of causing the collars to move simultaneously in opposite directions upon the shaft, the threads on the rods 7 and 8 are respectively cut right and left from the longitudinal center thereof, the outer ends of said threaded rods, being fitted to rotate in bearings in the disks 2 3 near and at equal distances from the line of the pulley shaft. The arrangement of threads and collars is such that when said threaded rods are actuated in one direction the collars are drawn apart, and, when driven in the opposite direction, the collars are drawn toward each other upon the shaft. By this means also, and the engagement of said collar spokes *a a* with said link bars, the latter may be moved from their diagonal positions, shown in full lines in Fig. 3, to the vertical positions shown by dotted lines, thereby enlarging the diameter by the movements of the several rim segments 4 as aforesaid. By this means also I avoid the use of a hollow hub with a single threaded rod extending therethrough for a similar purpose, as heretofore used, simplify the construction of the pulley and reduce the friction of the lever actuating means to a minimum by the use of a pair of said threaded rods in operative engagement with said collars respectively, near their attachments with said link bars. To simultaneously actuate said pair of threaded rods in like manner, as required to actuate said collars as aforesaid, I employ the following de-

scribed mechanism: Upon the outer face of disk 3 I mount the two gear wheels 20 21, (best shown in Fig. 2,) adapted to mesh with the two pinions 22 23 respectively, which are mounted on the respective ends of the threaded rods 7 8. To accomplish the rotation of said threaded rods simultaneously, I mount a disk 5 on the shaft 1 so as to rotate adjacent to said disk 3 and independently thereof. Said disk 5 is provided with an internal cog-gear 5^a under its flanged periphery, which is adapted to mesh with said gear wheels 20 and 21, as shown in Fig. 2, and to rotate in either direction on said shaft by the action of a sleeve 6 to which said disk is rigidly attached. A pair of spiral grooves 11 each as a cam furrow directly opposite the other, is cut in said sleeve, and a slot 14 is cut in and along the shaft from end to end of the sleeve. A ring or collar 9 is fitted loosely around said sleeve, and a bolt 12 is passed through the said collar and the slot 14 in said cam grooves. The construction is such, that when said collar 9 is moved back and forth along said sleeve, the latter is made to rotate by the action of said bolt 12 in said spiral grooves 11 and slot 14, independently of the rotation of said shaft in either direction, and said disk 5 is thereby actuated accordingly. To accomplish the sliding movement of said collar upon said sleeve, I construct a rim extension 10 and a laterally movable frame 15 having suitable rods 13 13 secured thereto and fitted to engage said rim on both sides as shown in Fig. 4. Said frame 15 may be actuated laterally by means of a hand lever in the usual well known way; the method of operating the same being immaterial, the same is not shown in the drawings. It is apparent that by means of this shiftable collar upon the sleeve, the sleeve, and thereby the said co-acting members which serve to expand or contract the periphery of the pulley, may be rotated independently of the shaft while said shaft is in rotation. Means, in all respects similar, may be employed to actuate a pair of such expansible pulleys inversely, that is, to expand the one while the other is being proportionately contracted, and vice versa. It is also apparent that by limiting the movement of the collar 9 by locking the actuating frame 15, the segments 4 may be locked accordingly and the relative size of the pulley may be determined and securely held in any desired position of enlargement or contraction. I do not, however, limit myself to the means shown for shifting the position of the collar 9 upon the sleeve, and other suitable means may be employed for accomplishing such movement in the direction of the arrows *c c* (Fig. 3), and other mere changes in form in details of construction may be substituted for those herein shown and described.

I am aware it is not new to employ a pair of threaded rods in connection with a pair of collars slidable on a common shaft, to construct an expansible pulley, and such I do not broadly claim. But I believe it is new to mount a pair of collars which are adapted to slide upon a common shaft within the body of a pulley whose end sections are rigidly secured to the shaft, said collars being respectively linked to expansible segments within the pulley.

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

1. In an expansible pulley, the combination with a shaft, of a pair of end sections rigidly mounted opposite each other thereon, a series of adjustable rim segments fitted to slide in and out along radial grooves in said end sections, a pair of collars linked to said rim segments and mounted and adapted to slide laterally on said shaft between said end sections, a pair of right and left threaded rods mounted in said end sections on opposite sides of said pulley shaft to actuate said collars toward and away from each other between said sections, a pair of cogged pinions mounted on said threaded rods respectively, a pair of gear wheels mounted on one of said end sections and adapted to gear with said pinions respectively, a rotatable disk having internal gear teeth adapted to mesh with said gear wheels to actuate the same simultaneously in either direction, and means in connection with said rotatable disk for rotating the same on said pulley shaft independently of the rotation of said shaft, substantially as set forth.

2. In an expansible pulley, the combination with a shaft, of a pair of end sections rigidly secured to said shaft and provided with radial grooves, a series of rim segments, operable in said grooves respectively, a pair of collars slidably mounted on said shaft between said end sections, a pair of link bars linked to said collars and to each segment respectively, a pair of right and left threaded rods mounted in said pulley sections on opposite sides of said shaft and extending through said collars, a pair of gear wheels mounted upon an end section in operative connection with said threaded rods respectively, a disk, having a flanged periphery and internal gear teeth, mounted rotatably on said shaft adapted to engage said gear wheels, and a sleeve rigidly secured to said disk, and means for actuating said sleeve endwise in either direction to rotate the same independent of the rotation of said shaft, substantially as set forth.

3. In an expansible pulley, in combination, a shaft, a pair of end sections rigidly secured thereto, a series of rim segments operable between said end sections, a pair of collars slidably mounted on said shaft be-

tween said sections, a pair of link bars
linked to said collars respectively and to
each rim segment, a pair of right and left
threaded rods mounted in said sections on
5 opposite sides of said shaft, in operative en-
gagement with said collars, a pair of gear
wheels mounted to rotate said threaded rods
respectively, adjacent to one end section, a
disk having an internal gear in operative
10 engagement with said gear wheels, and a
sleeve rigidly secured to said disk and loosely
mounted on said shaft, said sleeve having a
pair of spiral grooves therein, and a shaft
having a longitudinal groove in said shaft

within said sleeve, a collar slidably mounted 15
on said sleeve, and a bolt passing from said
collar into said longitudinal groove through
said spiral grooves, and means for sliding
said collar along said shaft while it rotates,
substantially as set forth and for the pur- 20
pose specified.

In witness whereof I hereunto set my hand
this 8th day of June 1909.

HARRY D. GAULT.

In presence of—

HIRAM SWARTZ,
W. E. FRANKS.