No. 702,630. Patented June 17, 1902.

E. CHRISTENSEN.

VARIABLE SPEED SHEAVE.

(Application filed July 15, 1901.)

(No Model.)

Fig. 1.

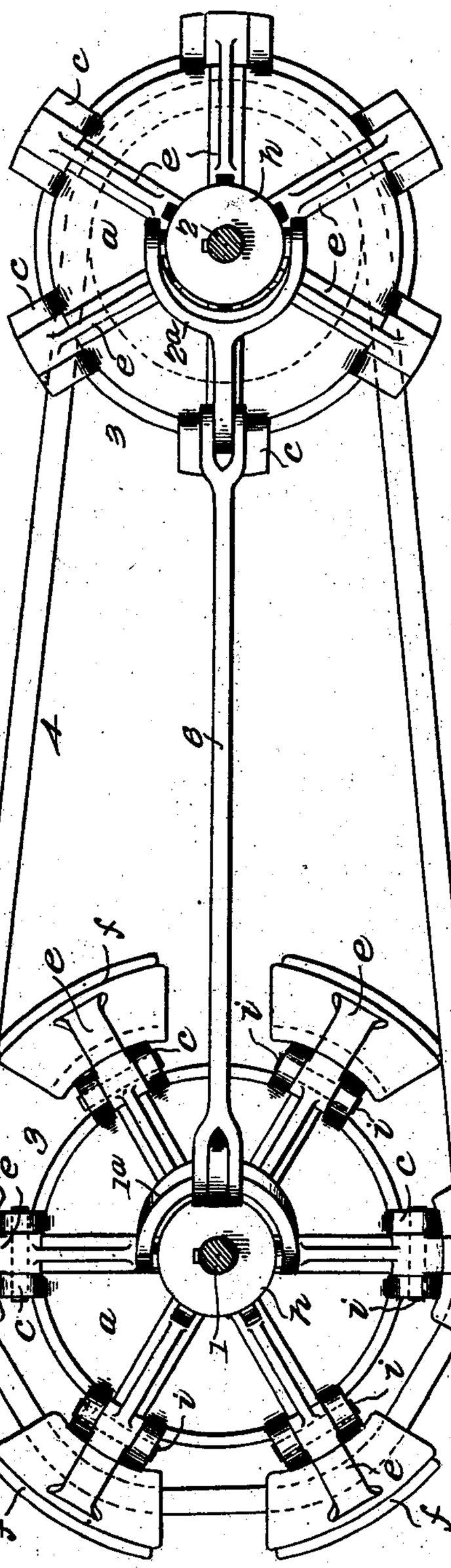
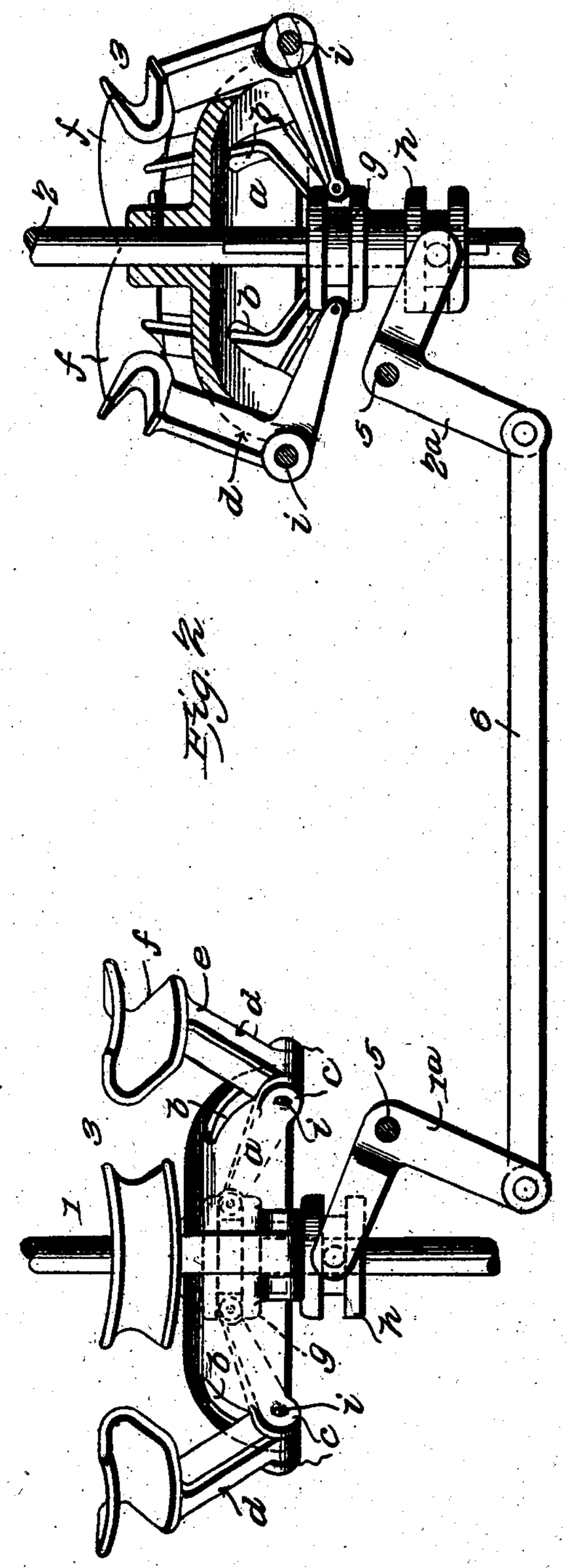


Fig. 2.



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UNITED STATES PATENT OFFICE.

EMIL CHRISTENSEN, OF PORTLAND, OREGON.

VARIABLE-SPEED SHEAVE.

SPECIFICATION forming part of Letters Patent No. 702,630, dated June 17, 1902.

Application filed July 15, 1901. Serial No. 68,382. (No model.)

To all whom it may concern:

Be it known that I, EMIL CHRISTENSEN, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented a new and useful Variable-Speed Sheave, of which the following is a specification.

My invention relates to an improvement invariable-speed sheaves for transmitting power from one shaft to another and increasing or decreasing the speed of the driven shaft at will without affecting the speed of the driving shaft; and it consists in the peculiar construction and combination of devices hereinafter fully set forth and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a pair of my improved variable-speed sheaves, showing the same respectively on a driving-shaft and a driven shaft and provided with means for simultaneously operating them, whereby the speed of the driven shaft may be varied at will without varying the speed of the driving-shaft. Fig. 2 is a top plan view of the same, the driven sheave being shown in section.

I will term the shaft 1 the "driving-shaft" and the shaft 2 the "driven shaft." A variable-speed sheave 3 is secured on each of the said shafts, the said sheaves being fast thereto. The said sheaves are alike in construction, and a description of one of them will suffice for the purposes of this specification. The central portion *a* is here shown as forming a circular concavo-convex web, in which at the periphery thereof are radial openings *b*, and on opposite sides of each of the said openings are lugs or ears *c*. A series of bell-crank levers *d*, which are preferably of the form here shown, are pivotally mounted between the ears *c*, and their outer arms *e* are adapted to operate in the openings *b*. The outer ends of the said bell-crank levers carry segments *f*, which are here shown as grooved and are adapted to be engaged by a flexible endless element for transmitting power from one sheave to another, as an endless belt or an endless cable 4. The inner ends of the bell-crank levers engage an annular groove *g* in a sleeve *h*, which is splined on the shaft. It will be understood that by moving the sleeve *h* inwardly on the shaft toward the web *a* the bell-crank levers will be so turned as to move the segments *f*, which form the periphery of the sheave, outwardly, and thereby increase the diameter of the said sheave, and that by moving the said sleeve in the opposite direction the diameter of the said sheave may be decreased. Hence the endless traveling power-transmitting element engaged by the peripheral segments of the sheave may be driven at a greater or lower rate of speed by varying the distance between the said segments and the center of the sheave, as will be understood.

In practice I provide means for simultaneously reversely adjusting the radial movable segments of the driving and driven sheaves. As here shown, I provide a pair of bell-crank levers 1^a and 2^a, which are respectively connected to the sleeves *h* of the driving and driven shafts, the said bell-crank levers being disposed in reverse relation to each other, their fulcrums being indicated at 5, and the said bell-crank levers being connected together for simultaneous movement by a rod 6, which forms the shifter. Any suitable means, (not shown,) as a lever or the like, may be employed for operating the shifter.

It will be understood from the foregoing that when the peripheral segments of one of the sheaves are moved outwardly to enlarge the diameter of said sheave the corresponding segments of the other sheave are reversely moved to reduce the diameter thereof, and hence the endless power-transmitting element 4 remains effective under all conditions. It will be understood that assuming one of the shafts to be the driving-shaft and the other the driven shaft the speed of the latter may be increased or diminished at will, while the speed of the driving-shaft is unvaried.

Having thus described my invention, I claim—

1. The combination of a shaft, a hub element thereon, having radial slots, a plurality of radially-disposed bell-crank levers disposed transversely of said slots, pivoted to said hub element and having circumferentially-grooved segments at their outer ends adapted to engage an endless flexible power-transmitting element, a ring to which the inner ends of said bell-crank levers are pivotally connected, and a shiftable sleeve, on said

shaft, having an annular groove engaged by said ring, substantially as described.

2. A variable-speed sheave, comprising a hub element having radial slots, a plurality of radially-disposed bell-crank levers pivoted to said hub element, having their outer arms disposed in and transversely of the slots and provided at their outer ends with circumferentially-grooved segments adapted to engage an endless flexible power-transmitting element, and means, connected to the inner arms of the bell-crank levers, to turn the latter on their pivots and thereby vary the radius of the grooved segments, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

EMIL CHRISTENSEN.

Witnesses:

CHAS. H. KORELL,

CHAS. HUTCHINS.