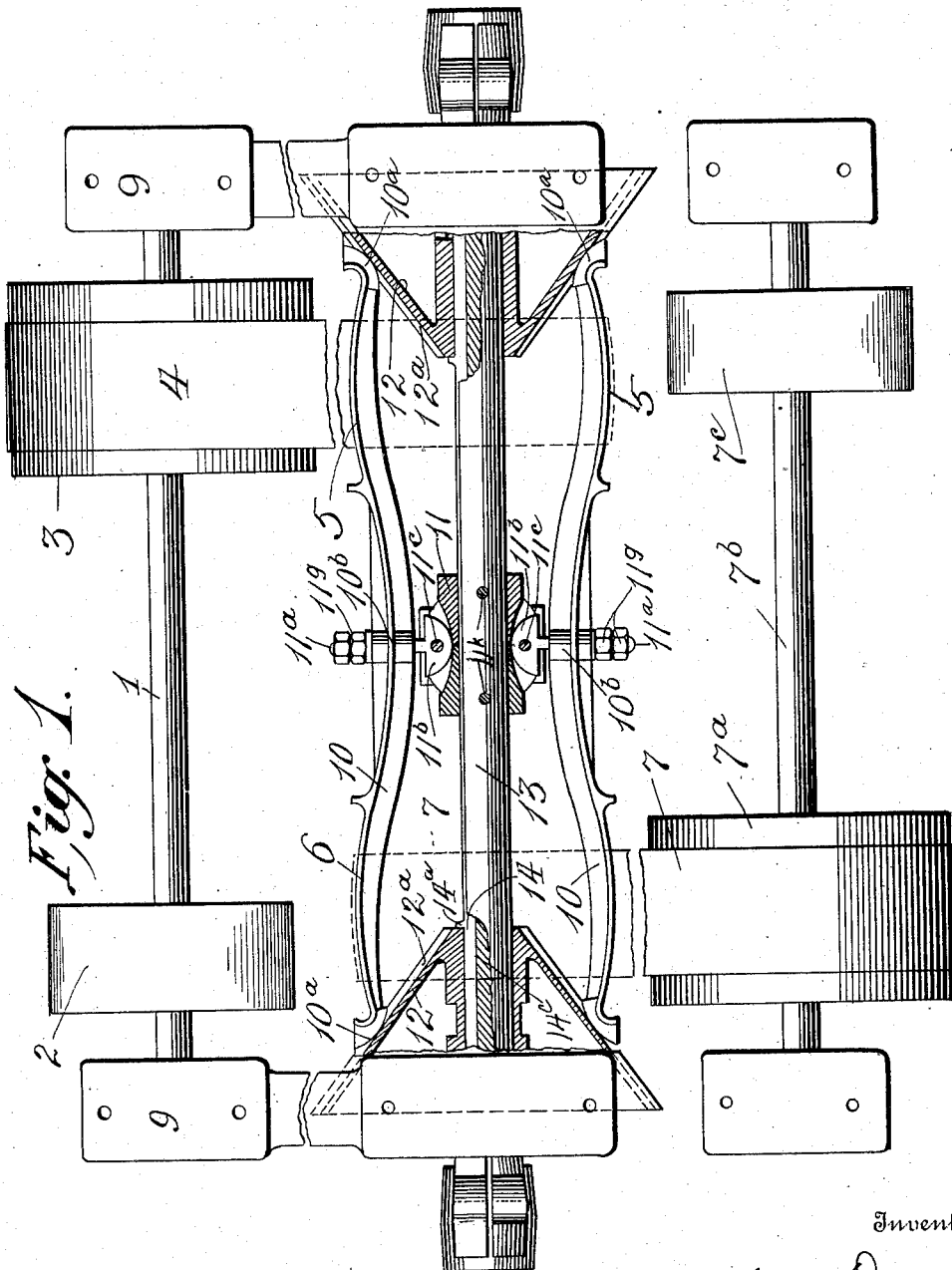


N. & D. S. DU BRUL.
 VARIABLE SPEED PULLEY.
 APPLICATION FILED APR. 13, 1910.

1,015,427.

Patented Jan. 23, 1912.

3 SHEETS—SHEET 1.



Witnesses
Jos. F. Collins.
W. H. H. H. H.

By

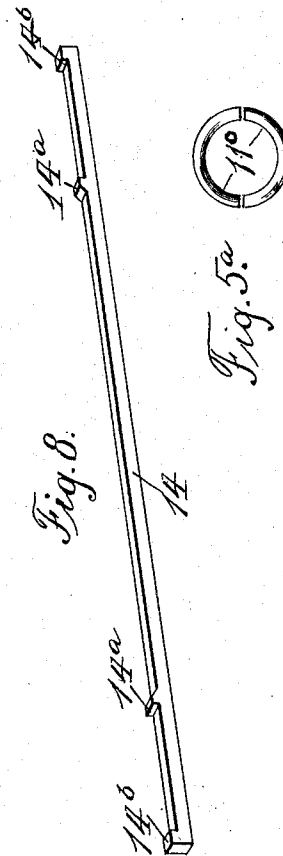
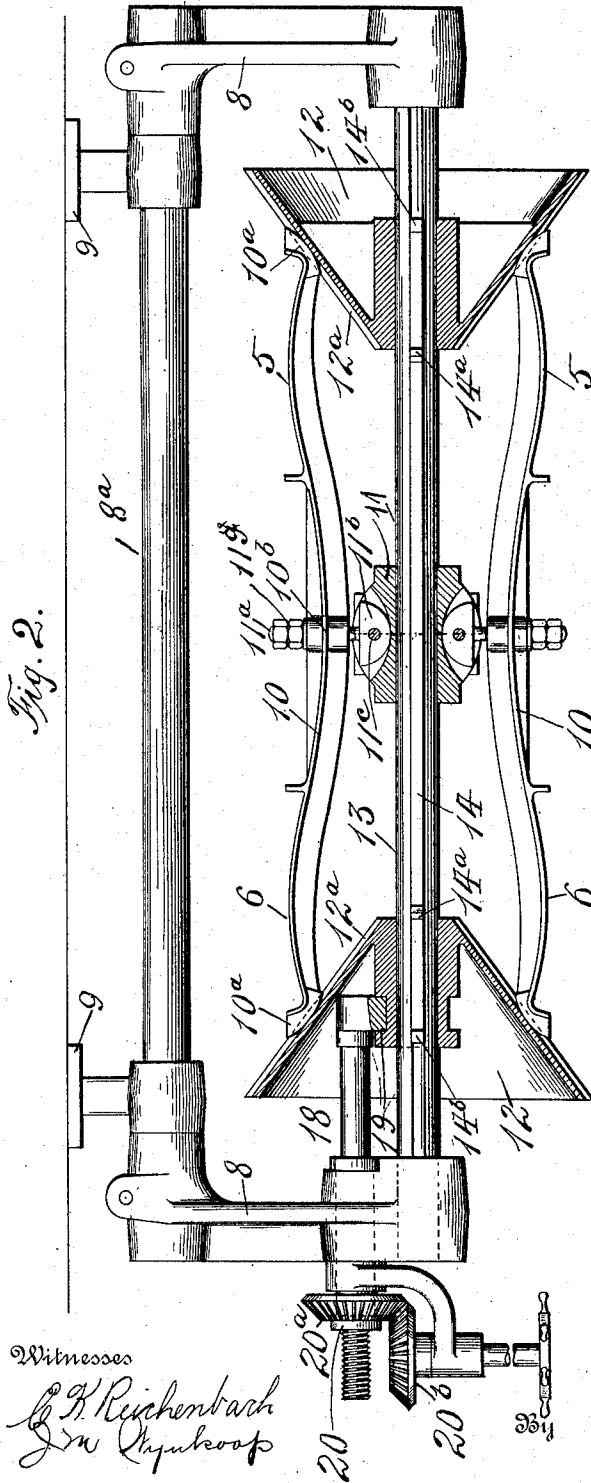
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

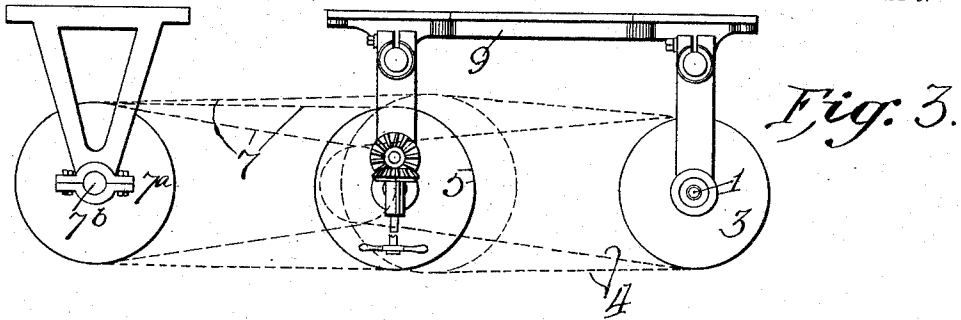


Fig. 4.

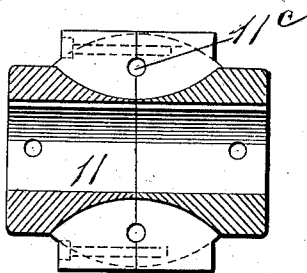


Fig. 5.

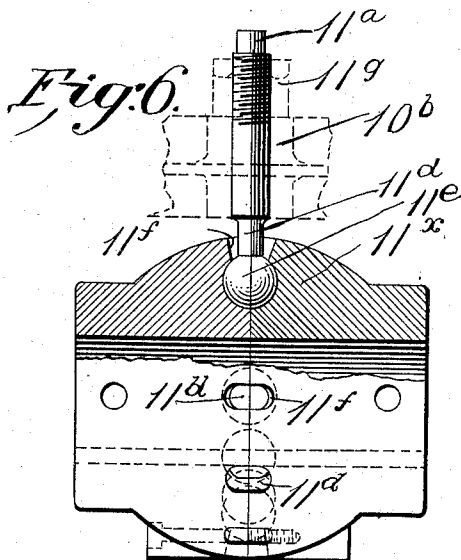
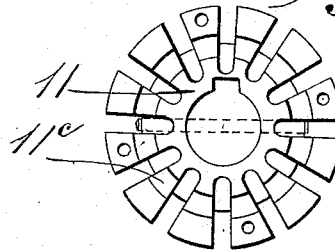
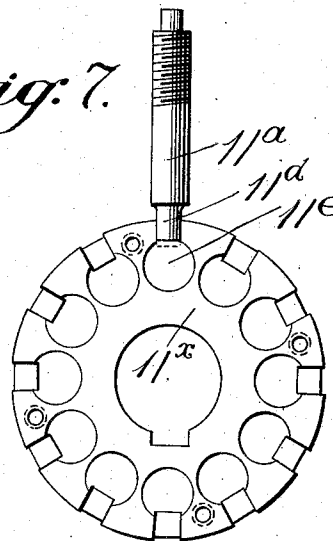


Fig. 7.



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UNITED STATES PATENT OFFICE.

NAPOLEON DU BRUL AND DAVILA S. DU BRUL, OF CINCINNATI, OHIO.

VARIABLE-SPEED PULLEY.

1,015,427.

Specification of Letters Patent.

Patented Jan. 23, 1912.

Application filed April 13, 1910. Serial No. 555,270.

To all whom it may concern:

Be it known that we, NAPOLEON DU BRUL and DAVILA S. DU BRUL, citizens of the United States of America, and residents of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Variable-Speed Pulleys, of which the following is a specification.

This invention relates to certain novel features of construction of that type of speed changing device described in Letters Patent of Richard E. Rosewarne, No. 949,005, granted February 15, 1910, wherein are described and claimed two reciprocally expanding and contracting pulleys, each of which comprises a group of circumferentially disposed rim-forming sections, and an expanding means, which engage the rim sections and by axial movement relatively to the rim, control the diameter of the rim produced by said sections; also to a single pulley *per se* having certain novel characteristics, and useful in the arrangement of the kind stated.

One object of our present invention is to make the construction adjustable for wear, so that the rim members will be held firmly against the spreading members without vibration, and complete balancing of forces of the two pulleys as well as simultaneous reciprocal movements of the pulleys will be insured; also to so construct the lever fulcrums that they can be separately mounted in the fulcrum member.

In the accompanying drawings, which illustrate the preferred embodiment of the invention, Figure 1 is a plan view partly in section of the improved construction of pulleys combined with a reversing gearing on a counter-shaft, from which the pulleys are driven; Fig. 2 is an axial section through the pulleys in a plane at right angles to Fig. 1; Fig. 3 is an end view corresponding to Fig. 1; Figs. 4 and 5 are respectively an axial section of the intermediate two part fulcrum member and a face view of one of the parts thereof; Fig. 5^a is a detail view of the annular fulcrum pin upon which the rim-forming members of the pulley are pivoted; Fig. 6 is a detail view partly in longitudinal section, of the fulcrum member and its connection; Fig. 7 is a central transverse section of the same; and Fig. 8 is a detail view of the key by which the spreading

cones are fixed against relative axial movement while permitted to slide axially upon the shaft.

Our invention may be advantageously employed in connection with a counter-shaft 1, driven by a pulley 2 and carrying a pulley 3, which is connected by a belt 4 with the driven pulley 5 of our speed changing gearing, which in turn transmits the rotation to the driving pulley 6, which is to be belted to the apparatus which it is desired to operate.

The pulleys 5 and 6 are constructed of arms 10 intermediately fulcrumed upon a member 11, but according to our invention this fulcruming is attained through the medium of posts 11^a having rocking heads 11^b pivotally mounted upon the annular fulcrum pin 11^c (Figs. 2, 4 and 5^a). Said arms 10 are, as heretofore, adapted to bear through their respective rim forming ends 10^a in the grooves 12^a of a pair of spreading cones 12, which are slidingly mounted upon the shaft 13, but according to our invention these cones are connected by a key 14 having projections 14^a 14^b, which prevent relative movement of the cones on the key but permit the sliding movement of the cones on the shaft. The cones are moved by a thrust rod 18 connected at 19 with one of the two interlocked cones and having an adjusting nut 20 mounted upon the frame 8 and adapted to be rotated by gearing 20^a 20^b.

The described arrangement is such that each cone, while preventing circumferential displacement of the ends of the pulley sections bearing upon it, tends to rock these members upon their fulcrums and thus press their opposite ends into intimate contact with the other cone. Thus, while the cones may be shifted so as to enlarge one pulley and permit contraction of the other pulley, the parts will at all times be held in intimate contact and will be free from rattle or vibration. While the bearing of the pulley sections upon the cones is primarily determined by properly spacing the cones apart, we prefer to have the pulley sections radially adjustable on their posts 11^a and for this purpose we provide the adjusting nuts 11^c.

The shaft 13 may be conveniently mounted in the arms 8 pivotally supported by the shaft 8^a in the brackets 9 so that as one pulley contracts and the other enlarges, the

speed changing gear can swing on the axis 8^a to tighten or loosen the belts which connect the respective pulleys with the driving and driven elements.

5 A split annular fulcrum 11, which provided direct bearing for the pulley sections in the before-mentioned patent, is employed for our novel construction of posts 11^a, and the member 11 is divided in the transverse
10 plane of the annular series of fulcrum bearings 11^c, as shown in Figs. 4 and 5, in order to permit introduction of the ring 11^o into said fulcrum bearings 11^c. The member 11 is moreover provided with bearing seats 11^d
15 for the heads 11^b of the posts 11^a; also a key seat 14^o for the passage of the key 14, and the parts of the fulcrum member 11 are secured together by screws 11^e. To prevent longitudinal movement of the member 11
20 on the shaft 13, pins 11^f are passed through the fulcrum member 11 and the shaft 13.

The pivoted levers, which form the rim sections, are more or less resilient in construction so that they will remain in close contact
25 with the cones, without vibration, the cone of each pulley constituting a resisting member for the arms that form the other pulley.

Having thus described our invention, what
30 we claim as new therein and desire to secure by Letters Patent is:—

1. An expansible pulley comprising a plurality of intermediately fulcrumed levers, a spreading member for said levers and a resisting member coöperating with the levers
35 on the opposite sides of their fulcrums from the spreading member, and forcing the levers to bear against their spreading member; the fulcrums of said levers comprising radially extending posts having rocking bearings at their inner ends and fitted to said levers at points radially beyond their said rocking
40 bearings.

2. An expansible pulley comprising a plurality of intermediately fulcrumed levers, a spreading member for said levers and a resisting member coöperating with the levers on the opposite sides of their fulcrums from the spreading member, and forcing the
50 levers to bear against their spreading member; the fulcrums of said levers comprising radially extending posts having rocking bearings at their inner ends and fitted to said levers at points radially beyond their said
55 rocking bearings; said levers being radially adjustable upon said fulcrum posts.

3. An expansible pulley comprising a plurality of intermediately fulcrumed levers, a spreading member for said levers and a resisting member coöperating with the levers on the opposite sides of their fulcrums from the spreading member, and forcing the
60 levers to bear against their spreading member; the fulcrums of said levers comprising radially extending posts having rocking
65 bearings at their inner ends and fitted to said levers at points radially beyond their said rocking bearings; said levers being radially adjustable upon said fulcrum posts.

bearings at their inner ends and fitted to said levers at points radially beyond their said rocking bearings; said levers being radially adjustable upon said fulcrum posts and said fulcrum posts having means for forcing the levers inward on the posts for the purpose of developing pressure between the ends of the levers and the members upon which they bear.

4. In an expansible pulley comprising a plurality of intermediately fulcrumed levers having in coöperation with their respective ends, a spreading member and a resisting member for holding the levers in bearing upon the spreading member; the fulcruming means for said levers comprising an intermediate fulcrum bearing member and radially extending posts, having bearings upon said fulcrum bearing member, which permit the posts to rock in radial axial planes and affording support for the levers at points radially beyond their rocking bearings.

5. An expansible pulley comprising the levers, the reciprocally acting spreading cones engaging the respective ends of the levers, the intermediate fulcrum member mounted co-axially with the cones, the fulcrum posts pivotally mounted upon the fulcrum member in radial axial planes, bearings in the levers receiving said posts, and adjusting means for pressing the levers radially inward upon the posts to hold the ends of the levers in impingement with the spreading cones.

6. In an expansible pulley of substantially the character described, comprising a shaft, intermediately fulcrumed levers mounted upon said shaft in annular series and an expanding cone mounted coaxially upon said shaft and movable relatively to the levers for varying the diameter of the pulley provided by said levers; means for shifting the expanding cone comprising a thrust shaft parallel to the pulley shaft, a wrist bearing connecting said thrust shaft with the cone, a nut threaded upon said thrust shaft, bearings for said nut which prevent axial movement of the nut and a gearing through which said nut is rotated at will.

7. A speed changing device embodying a shaft having a key-way, two reciprocally expanding and contracting pulleys comprising two series of rim sections and a series of intermediately fulcrumed connecting levers, permitting movement of the rim sections in radial planes only, a pair of expanding members coöperating with the respective pulleys for the purpose of expanding and contracting them, and a key member fitted in the longitudinal key-way of the shaft, fixed to the expanding members by means which prevents both axial and circumferential movements of the expanding members relative to the key; said expanding

members being held by said key in contact with the pulley rim sections, whereby movement of the connected expanding members in either axial direction, enforces an expanding movement in one pulley and a contracting movement in the other pulley.

5 8. In a speed changing gear of substantially the character described and embodying longitudinal levers, means for fulcrum-

ing said levers, and adjusting them bodily 10 in radial axial planes.

The foregoing specification signed at Cincinnati Ohio this 8th day of January, 1910.

NAPOLÉON DU BRUL.

DAVILA S. DU BRUL.

In presence of—

W. J. HUNTER,

E. F. DU BRUL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."