No. 725,991. PATENTED APR. 21, 1903.

L. E. ROBINSON.

REVERSING MECHANISM.

APPLICATION FILED JUNE 12, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 2.

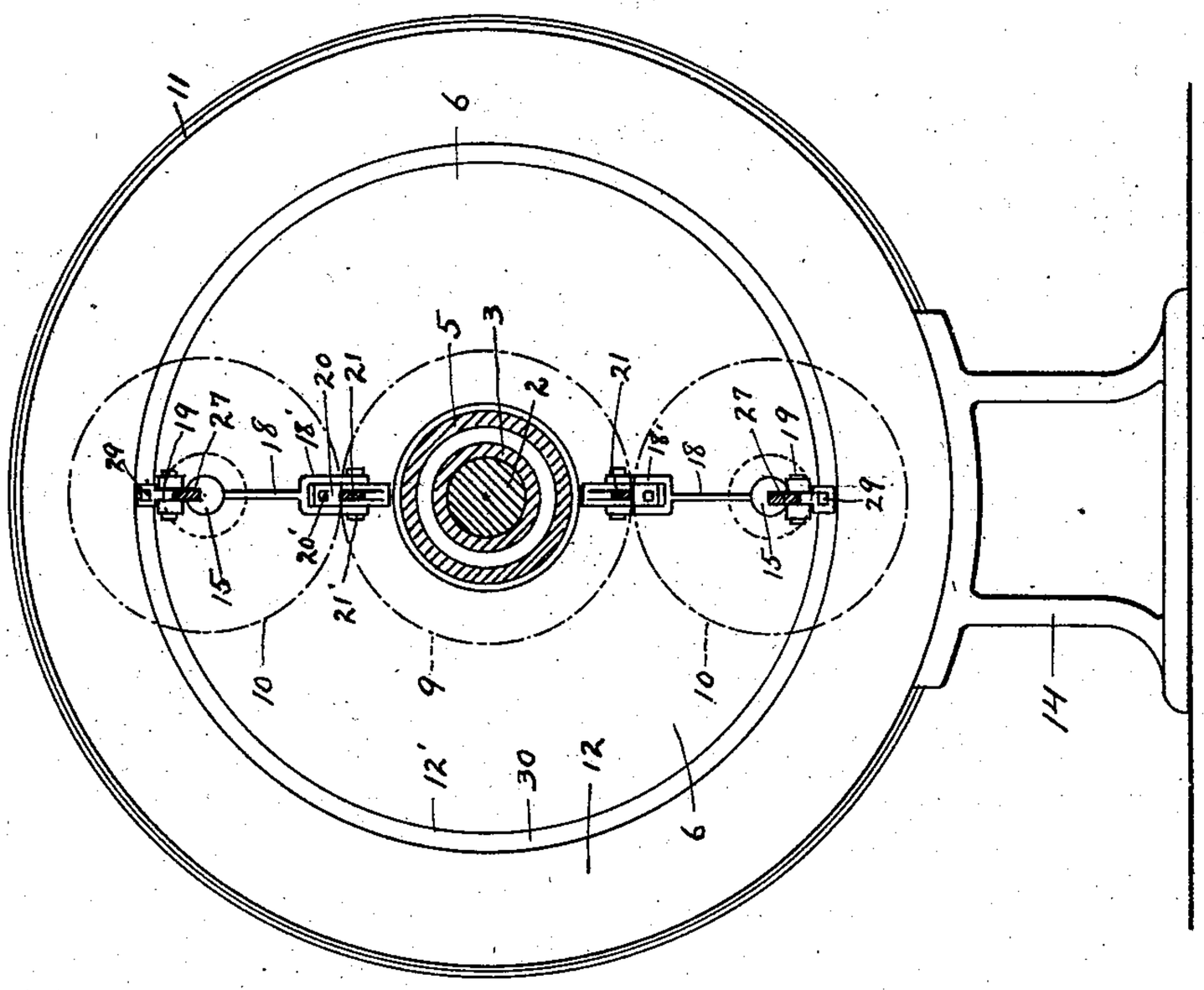
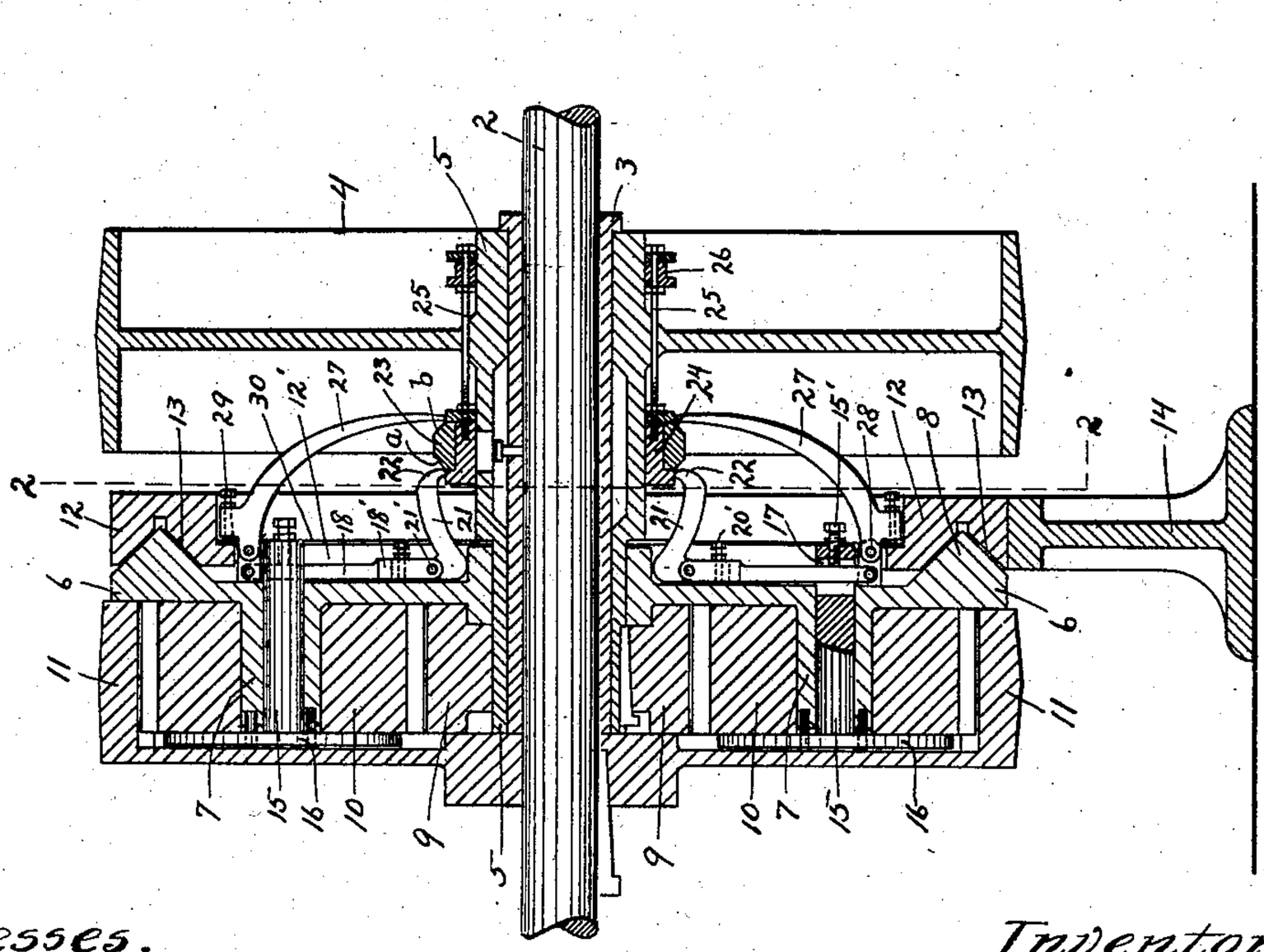


Fig. 1.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig: 3

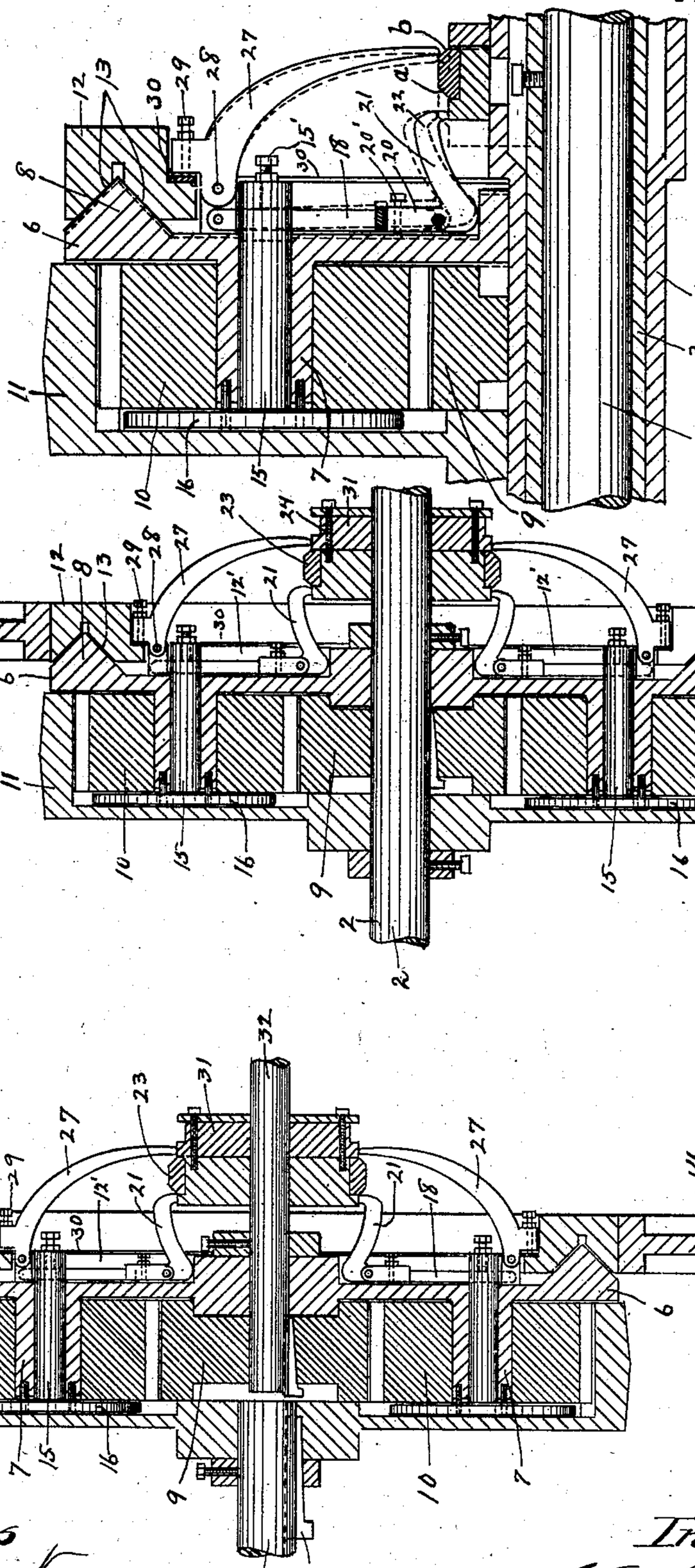

Fig: 4

Fig: 5

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UNITED STATES PATENT OFFICE.

LAWRENCE E. ROBINSON, OF BUTLER, PENNSYLVANIA, ASSIGNOR OF ONE-FOURTH TO P. E. DAUBENSPECK, OF BUTLER, PENNSYLVANIA.

REVERSING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 725,991, dated April 21, 1903.

Application filed June 12, 1902. Serial No. 111,405. (No model.)

To all whom it may concern:

Be it known that I, LAWRENCE E. ROBINSON, a citizen of the United States, residing at Butler, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Reversing Mechanism, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to reversible clutch-pulleys, and more particularly to certain improvements in the pulley mechanism patented to me August 27, 1901, No. 681,511, whereby the same is simplified, rendered more effective, and adapted to a wider range of use than heretofore.

The invention consists in the novel structural features and combination of parts hereinafter fully described and claimed, and illustrated by the accompanying drawings, wherein—.

Figure 1 is a vertical longitudinal sectional view of reversible clutch-pulley mechanism constructed in accordance with my invention. Fig. 2 is a cross-sectional view on line 2 2 of Fig. 1. Fig. 3 is a sectional view of a portion of the pulley on an enlarged scale. Figs. 4 and 5 are views similar to Fig. 1, illustrating different adaptations of the invention.

Referring to the drawings, and more particularly to Figs. 1, 2, and 3 thereof, 2 designates the shaft, and secured thereto is elongated bushing 3. Loosely mounted on this bushing is pulley 4, constructed with elongated hub 5. Rotatable on the extended portion of hub 5 is the wheel-like head or member 6, and projecting from one face of this head are the diametrically opposite hollow studs 7, while the opposite face of the head is formed with annular flange 8, tapering or V shape in cross-section. Keyed to the extremity of pulley-hub 5 is gear 9, and meshing therewith are gears 10, rotatable on studs 7, and which in turn mesh with the large internally-toothed pulley-like gear-wheel 11, keyed to shaft 2.

Between pulley 4 and head 6 is the non-rotatable ring-like head 12, formed with annular V-shaped groove 13, complementary with flange 8. This head may be secured to bottom support 14, as in Figs. 1, 2, and 5, or may be suspended from a hanger 14′, Fig. 4, dependent on the elevation or use of the shafting.

Movable longitudinally in hollow studs 7 are stems 15, carrying at one end the disk-like heads 16, located between wheel 11 and the outer faces of gears 10. Stems 15 project through head 6 and are slotted at 17 to pass levers 18, which are pivoted at their outer ends at ears 19 on said head. The inner ends of these levers are bifurcated at 18′, and pivoted therebetween at 21′ are short arms 20 of angular levers 21. The outer extremities 22 of levers 21 project in the path of bevel *a*, the oppositely-beveled ring 23, mounted on sleeve 24, adapted to slide on pulley-hub 5, being connected through the pulley-web by rods 25 to shifting collar 26, to which any suitable form of throwing-lever or other actuating mechanism (not shown) may be attached. Carried by short arms 20 of levers 21 are adjustable screws 20′, which bear against the face of head 6, and similar screws 15′ in the extremities of stems 15 form adjustable bearing-points for levers 18.

27 represents curved levers fulcrumed near their outer ends at 28 to ears 19 and at said ends carry screws 29, which form adjustable bearing-points for engaging the annular shoulder 12′, formed on the inner periphery of head 12 and faced with the thin bearing-ring 30. The free ends of curved levers 27 extend inward into the path of bevel *b* of ring 23.

In operation with the clutching mechanism in neutral position (shown in Fig. 1) the pulley is loose, being unconnected for positive rotation in either direction. When the pulley is to rotate with or in the same direction as the shaft, beveled ring 23 is moved inward or toward head 6 into engagement with levers 21, forcing the outer extremities of the latter outward radially and short arms 20 inward, with screws 20′ bearing against head 6, with the result that fulcrum-points 21′ of the levers are forced outward or away from head 6, moving therewith links 18, which in turn pull outward on stems 15 and cause heads or disks 16 to engage gears 10 and draw the latter so tightly against head 6 as to hold them against rotation. Thus a rigid connection is

formed between the shaft and pulley through the medium of shaft-driven gear 11, non-rotating gears 10, and gear 9, the latter being fixed on the pulley-hub. In this adjustment it will of course be understood that head 6 turns with the shaft and pulley.

To drive the pulley reversely to the shaft, bevel-ring 23 is drawn outward or away from head 6, forcing outward levers 27, and bearing-screws 29, serving as adjustable fulcrum-points, head 6 is drawn toward non-rotating ring 12, with V-shaped flange 8, tightly fitting corresponding groove 13 of the ring, thereby securing head 6 against rotation. In this adjustment, however, gears 10 are free to rotate on studs 7, and hence the motion transmitted therethrough to gear 9, rigid with the pulley, is the reverse of that of shaft 2 and driving-gear 11.

The periphery of gear-wheel 11 may be surfaced or crowned, as shown, to receive a belt for driving the same, in which case shaft 2 serves simply as a bearing or axial support for the clutch mechanism.

In the adaptation of the invention shown in Fig. 4 the reversing mechanism is shown applied to the shaft 2 for driving the same in either direction instead of driving a pulley, as in Fig. 1. Gear 11 is loose on shaft 2 and has its periphery crowned to receive a belt extending from a drive-shaft. The pulley-hub of Fig. 1 being absent, the mechanism is mounted directly on the shaft, though a bushing like that shown in Fig. 1 may be provided. The mechanism and means for adjusting the same for either motion are identical with those above described, save that shifting collar 31 is secured directly to sleeve 24, carrying bevel-ring 23.

In the adaptation shown in Fig. 5 the pulley of Fig. 1 is omitted, the mechanism being applied directly to the shafting, much as in Fig. 4; but in this embodiment of the invention the mechanism serves as a means for coupling an auxiliary shaft 32 with the drive-shaft 2 in such manner that the latter may be driven in either direction. The driven shaft 32 corresponds with pulley-hub 5 of Fig. 1 and has the reversing mechanism mounted thereon and gear 9 secured thereto in the same manner. In the one instance a pulley is driven, in the other a shaft. A removable key 33 unites gear 11 and shaft 2, which may be removed when power is applied through a belt on the periphery of wheel 11, in which case shaft 2 serves simply as a journal or axis for said wheel. The driven shaft may be larger or smaller than the drive-shaft and may represent counter-shafting, shafting for cranes and other machinery, the propeller-shaft of a boat, and, in fact, shafting for any and all purposes requiring a positive drive and a quick and sure reverse.

Obviously my improved mechanism may be employed for many uses wherein reversals of motion are desired, the embodiment of Fig. 1 being designed especially for pulley driving, while that shown in Figs. 4 and 5 is for shafts without the interposition of a pulley.

I claim—

1. The combination of independently-rotative driving and driven gears, an independently-rotative head, gears rotatively mounted on the head between and meshing with the first-named gears, means for holding said interposed gears against individual rotation, a non-rotating device, levers fulcrumed to the said head and adapted to engage the non-rotating device, and means for actuating the levers, substantially as described.

2. The combination of independently-rotative driving and driven gears, an independently-rotative head, gears rotatively mounted on the head between and meshing with the first-named gears, means for holding said interposed gears against individual rotation, a non-rotating device having an annular bearing-surface, levers fulcrumed on the rotative head and adapted to overhang and frictionally engage said bearing-surface, and means for actuating the levers, substantially as described.

3. The combination of independently-rotative driving and driven gears, rotative head 6, gears 10 rotatively mounted on the head between the first-named gears, devices for holding gears 10 against individual rotation, levers 18 fulcrumed to head 6 and operatively engaging said devices, angular levers 21 bearing against head 6 and pivoted to levers 18, and means for actuating levers 21, substantially as described.

4. The combination of independently-rotative driving and driven gears, rotative head 6, gears 10 rotatively mounted on the head between the first-named gears, fixed head 12, means including levers 21 for holding gears 10 against individual rotation, means including levers 27 for securing head 6 to head 12, and actuating mechanism common to levers 21 and 27, substantially as described.

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

LAWRENCE E. ROBINSON.

Witnesses:
ALBERT L. BOWSER,
JAMES MCLAUGHLIN.