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F. H. LEWIS.

TRANSMISSION GEAR.

(Application filed Mar. 27, 1902.)

(No Model.)

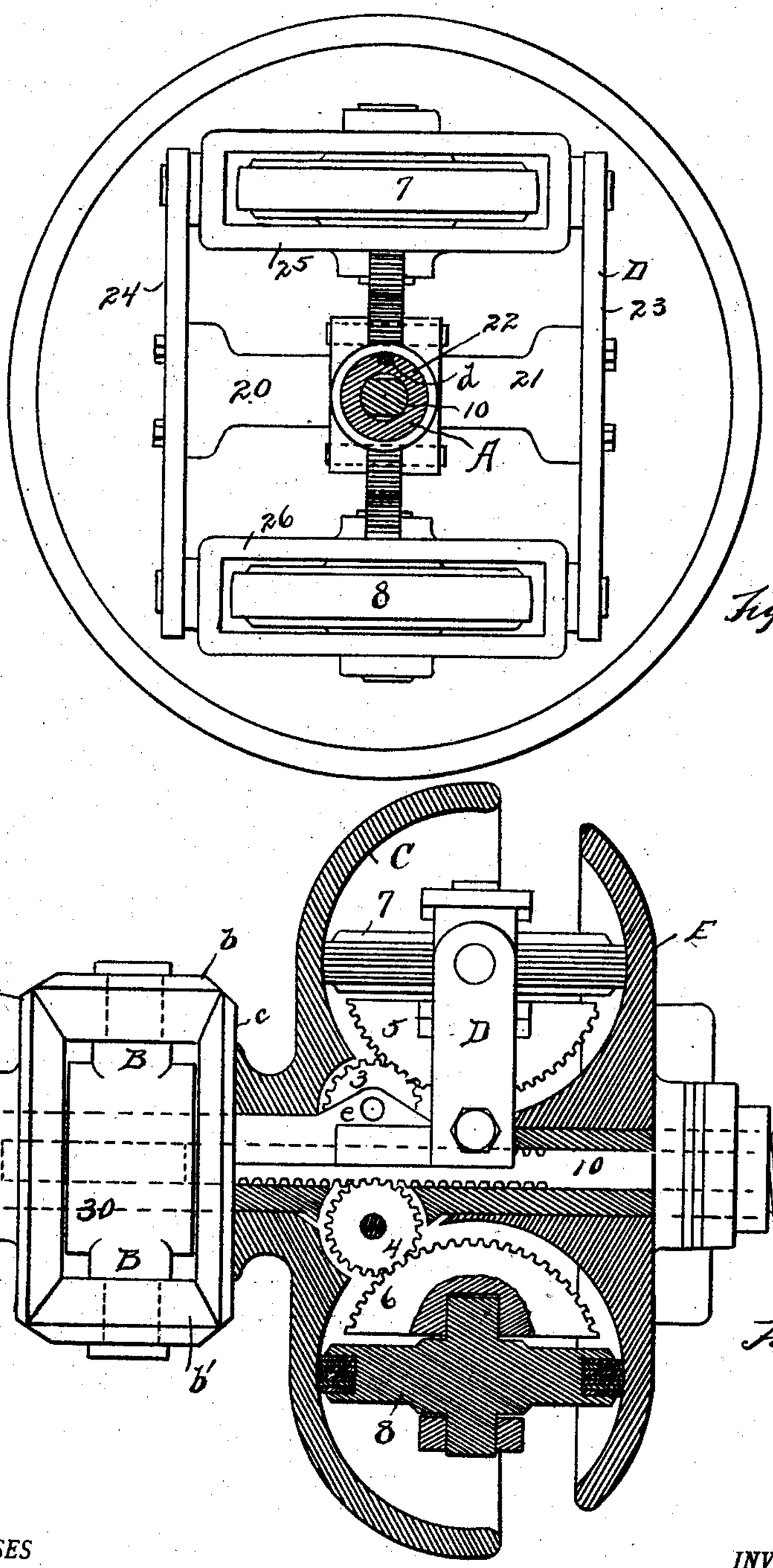

Fig. 2.

Fig. 1.

WITNESSES

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FRANK H. LEWIS, OF ANN ARBOR, MICHIGAN.

TRANSMISSION-GEAR.

SPECIFICATION forming part of Letters Patent No. 717,225, dated December 30, 1902.

Application filed March 27, 1902. Serial No. 100,179. (No model.)

To all whom it may concern:

Be it known that I, FRANK H. LEWIS, a citizen of the United States, residing at Ann Arbor, county of Washtenaw, State of Michigan, have invented a certain new and useful Improvement in Transmission-Gear; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to transmission-gear, and has for its object an improved gearing adapted to produce on a driven wheel or axle a motion that is variable with respect to the driving-wheel.

In the drawings, Figure 1 is partly in section and partly in elevation. It shows the torus-wheels. Fig. 2 is a view across the shaft, showing the torus-wheel C and the friction-wheels which engage against it.

A indicates a shaft, suitably journaled in any framework.

E is a double-concave friction-head made fast to the framework, provided with a torus-surface. The shaft A passes centrally through the head E.

C indicates a torus-wheel arranged opposite the head E and loosely mounted on the shaft A. On the hub of the wheel C is a beveled gear *c*.

D indicates a framework secured to the shaft A by key *d* and carrying journaled in it friction bearing-wheels that bear against the torus-wheel C and against the torus-head E. There may be any convenient number of these friction-wheels, as two or four placed opposite one another, or they may be arranged as a set of three at angles of one hundred and sixty degrees, (160°.)

In the frame D there are two arms 20 21, that branch from a central hub 22. Side bars 23 24 are bolted to the arms 20 21. Subframes 25 26 are journaled in the side bars, and friction-wheels 7 8 are journaled in the subframes. The main frame D is secured to the axle A and revolves with it. Each subframe can swing on its own journals, and the friction-wheels 7 8 can assume an angular position with reference to the shaft A and can change the contact between themselves and the torus-surface of wheel C.

Journaled on ears *e* on the shaft A are two small spur-gears 3 and 4, that mesh with gear-segments 5 and 6, that are fixed to the inner frames 25 26, which carry the friction-wheels 7 and 8. By turning the small gear-wheels 3 and 4 and the segments with which they mesh the angularity of the wheels 7 and 8 to the main shaft A is changed. The gear-wheels 3 and 4 mesh with a longitudinal movable rack 10, that is inserted in a longitudinal hollow within the shaft A and which is movable longitudinally by a lever forked over the double collars 11.

B indicates an arm or pair of arms projecting from a collar 30, that is fixed on the shaft A, and each arm bears a miter-gear *b* or *b'*, that is arranged to mesh with the miter-gear *c*.

F indicates the hub of a bevel-gear *a*, that meshes with the bevel-gears *b* and *b'*, and is provided with a sprocket-wheel *f* to be used for the further transmission of the power.

In the transmission of power, motion is communicated to the shaft A from any primary source of power. This causes a rotation of the frame D around the axis of the shaft A and by the action of the friction-wheels 7 and 8 on the two friction torus-surfaces E and C produces a revolution of C around its center, which is in the axis of the shaft A. The torus-wheel C carries with it the miter-wheel *c*, and this miter-wheel, meshing with the miter-wheels *b* and *b'*, which, revolving with the shaft A, produces a rotation of the miter-wheels *b b'* on their own axes, and as they are also revolving around the axis of the shaft A the sum of the two motions—that is, the sum of the motion of revolution and of the motion of rotation—is transmitted to the bevel-gear *a*, this sum being the algebraic sum, and the resultant motion may be either greater or less than the primary motion of the shaft A or it may be zero, the particular value of it being determined by the position of the wheels 7 and 8 with respect to the torus-wheels.

What I claim is—

1. In combination with a shaft, a pair of

bevel-gears loosely mounted thereon, an arm fixed to the shaft between said gears, a bevel-gear journaled on said arm and arranged to mesh with both the said loose gears, a friction-wheel fixed to one of said gears and having its friction-face opposite the beveled face, a friction-piece concentric with the shaft and fixed with respect thereto, and having its surface opposed to the surface of said friction-wheel, a frame carried by the shaft, a friction-wheel journaled in said frame and arranged to engage the friction-piece and friction-wheel, substantially as described.

2. In combination with a shaft, a pair of bevel-gears loosely mounted thereon, one of said gears being provided with a torus friction-surface on its opposite face, an arm fixed to the shaft, a bevel-gear journaled on said arm and arranged to mesh with both said loose bevel-gears, a torus friction-piece concentric to said shaft and fixed with the respect thereto, a frame fixed to said shaft, friction-wheels journaled in said frame, means for changing the inclination of said friction-wheels whereby they vary the relative speed of the shaft and the torus-surfaced wheel, substantially as described.

3. In combination with a hollow shaft, a torus-head concentric to said shaft, a torus-wheel arranged to rotate on said shaft, friction driving mechanism between the torus-head and the torus-wheel, a rack arranged in conjunction with said friction mechanism, a rack arranged longitudinal to and in the hollow of said shaft and a pinion meshing with each of said racks, means for actuating the longitudinal rack, a bevel-gear connected with the torus-wheel, a bevel-gear loose on said shaft, an arm intermediate the two bevel-gears fixed to said shaft and a bevel-pinion arranged to communicate motion from one of said bevel-gears to the other, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

FRANK H. LEWIS.

Witnesses:
CHARLES F. BURTON,
MAY E. KOTT.