

(No Model.)

G. COTTRELL.
DIFFERENTIAL GEAR.

No. 474,903.

Patented May 17, 1892.

Fig. 2.

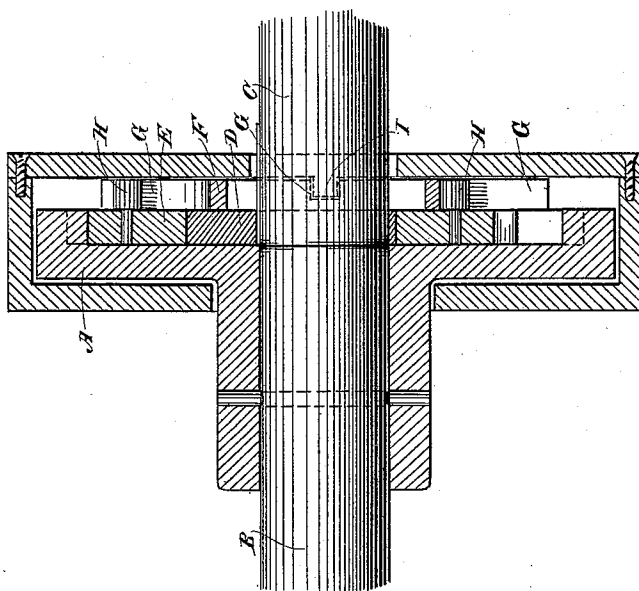
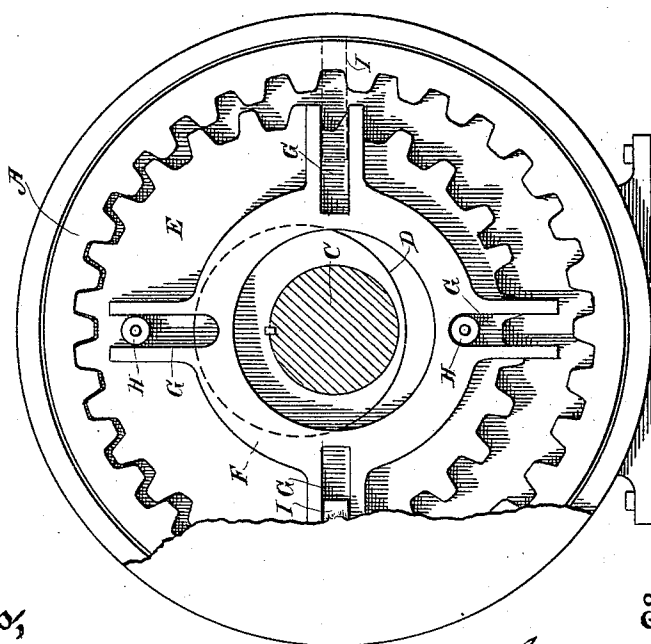


Fig. 1.



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UNITED STATES PATENT OFFICE.

GEORGE COTTRELL, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO THE
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DIFFERENTIAL GEAR.

SPECIFICATION forming part of Letters Patent No. 474,903, dated May 17, 1892.

Application filed December 30, 1891. Serial No. 416,586. (No model.)

To all whom it may concern:

Be it known that I, GEORGE COTTRELL, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Differential Gears; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a novel device for applying power by means of a differential gear.

It consists of an internally-toothed drum or gear, a spur-gear of smaller diameter, the teeth of which mesh into the teeth of the internal gear, an eccentric by which the spur-gear is given a throw, so that its teeth successively engage those of the internal gear, and a movable guiding disk or cross operating in conjunction therewith, and in certain details of construction.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a face view of my gears. Fig. 2 is a vertical section through the same.

A is a drum having internal teeth and a hub which is secured to the shaft B, to which power is to be conveyed.

C is the shaft from which power is to be conveyed to the shaft B. Upon this shaft C is fixed an eccentric D, and surrounding this eccentric is a spur-gear E, having a hole bored in it which allows it to just fit the outside of the eccentric. The throw of the eccentric is such that the teeth of the spur-gear E are caused to successively engage with the internal teeth of the drum A, thus forming a complete contact around the interior of the drum A at each revolution. The proportions of the gear E and interior toothed portion of the drum A are made dependent upon the difference in speed which is desired. If the drum A has thirty teeth and the gear E has twenty-five then the difference in speed will be as six to one, and any other proportion may be in like manner obtained by varying the number of teeth of the two, the difference being determined by dividing the number of teeth in the larger or internal gear by the difference between these and the number in the smaller spur-gear.

F is a disk or cross surrounding the shaft C, but having a hole in its center of sufficient diameter to prevent its making contact with the shaft when moved from side to side by the action of the eccentric. This cross has slots G made on opposite sides, and these slots fit over pins or anti-friction rollers H, which are attached to the adjacent face of the gear E and project into the slots G. It will be manifest that the eccentric motion of the gear would be conveyed to the disk or cross unless it were provided with an exterior guide. This is done either by slots corresponding to those shown at G traveling over stationary pins I or by extensions, which are fitted to travel in stationary guides fixed to an exterior casing, so that the only motion transmitted by the gear to the cross will be an oscillating one from one side to the other, the guides I preventing its turning or moving in any other way than reciprocally. This cross thus prevents the rotation of the internal gear E, and as it travels within the drum A it will cause the latter to advance with a rapidity proportioned to the difference in the number of teeth.

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

A differential gear consisting of the combination of the internally-toothed drum fixed to the driven shaft, an eccentric fixed to the driving-shaft, a spur-gear bored to fit the exterior of the eccentric loosely and turning within the internal gear of the drum, the throw of the eccentric being equal to the difference in the diameters of the engaging toothed faces, a disk having a central opening larger than the diameter of the shaft, whereby the disk may move sidewise, and having its opposite sides slotted to form guides and anti-friction rollers on the spur-gear, and working within the slots of the disk, substantially as herein described.

In witness whereof I have hereunto set my hand.

GEORGE COTTRELL.

Witnesses:

S. H. NOURSE,
H. F. ASCHECK.