

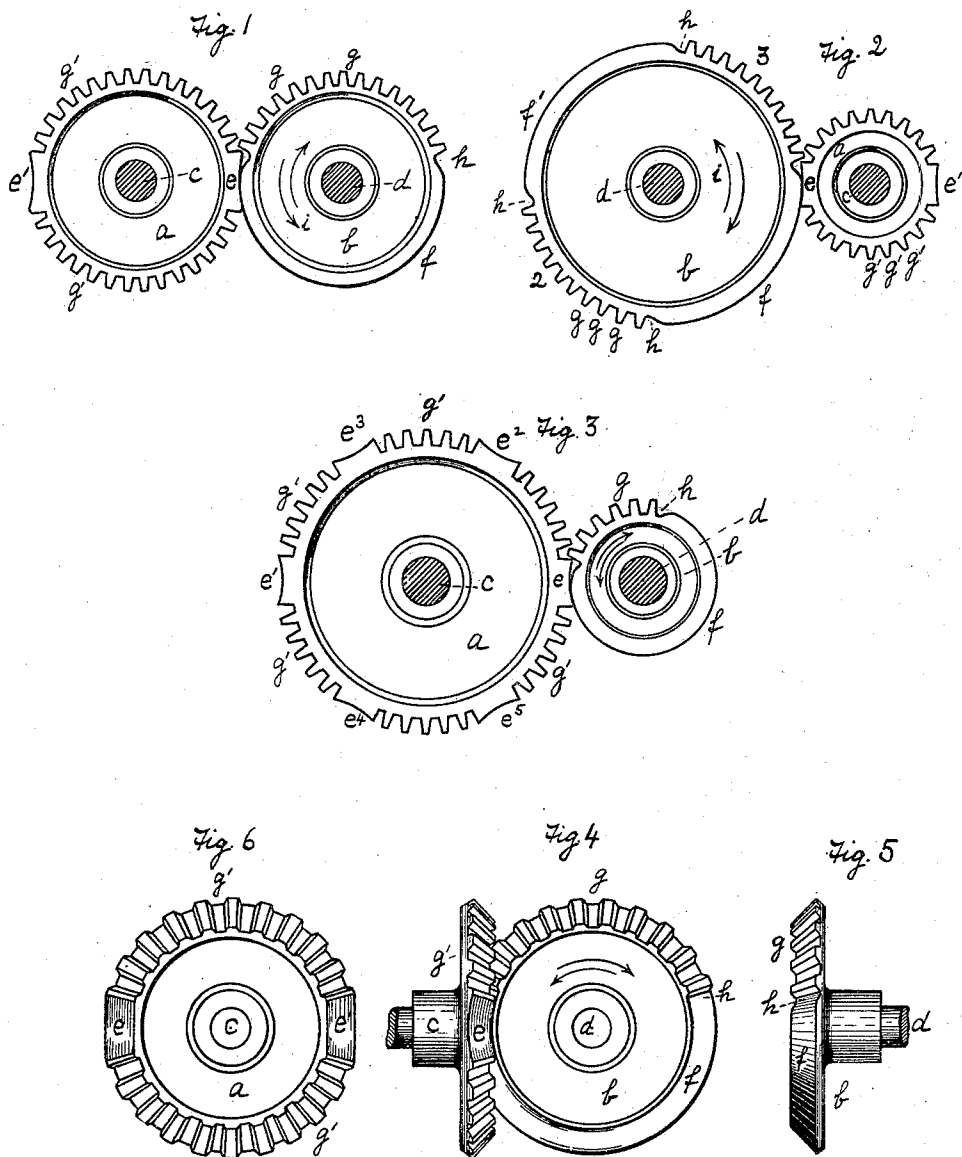
(No Model.)

H. SCHULZE-BERGE.

GEARING.

No. 319,513.

Patented June 9, 1885.



WITNESSES
Harry L. Gill.
J. A. Burns.

Hermann Schulze-Berge
INVENTOR
by Bakewell & Mess
his Attorneys

UNITED STATES PATENT OFFICE.

HERMANN SCHULZE-BERGE, OF ROCHESTER, PENNSYLVANIA.

GEARING.

SPECIFICATION forming part of Letters Patent No. 319,513, dated June 9, 1885.

Application filed December 20, 1884. (No model.)

To all whom it may concern:

Be it known that I, HERMANN SCHULZE-BERGE, of Rochester, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Gearings; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved gearing when applied to parallel shafts. Figs. 2 and 3 are similar views of modifications. Fig. 4 is a perspective view of my improvement applied to miter-wheels. Figs. 5 and 6 are views of the parts shown in Fig. 4.

Like letters of reference indicate like parts wherever they occur.

My invention relates to an improvement in gearing devices in that class of gear-wheels which, for the purpose of distinguishing them, I will herein designate as "lock" gear-wheels.

The object of the invention is to transfer continuous rotary motion of one shaft to a second shaft in such manner that the latter may rotate intermittently and at given intervals of time.

Referring to Fig. 1 of the drawings, *b* indicates a pinion or gear wheel, which has a continuous revolution imparted to it from its shaft *d*, and *a* is a second gear-wheel, of equal diameter, the teeth *g'* of which mesh into similar teeth *g*, on the pinion *b*. The rotation of the wheel *a* is actuated by the rotation of the toothed pinion *b*. The latter pinion, *b*, has teeth or cogs on only a part of its circumference—say, a little less than one-half thereof—the remainder, *f*, being circular and smooth, and of a diameter less than the external diameter of the toothed part, and preferably bounded by the pitch-line of the gear-wheels. The relation of the toothed to the untoothed portion of the cog *b* determines the relation of the period of rotation to the period of rest in the driven wheel *a*. On the gear-wheel *a* are lock-teeth *e e'*, which extend to the pitch-line of the wheels, and whose outer faces are concave in form, the concavity being determined by an arc of the part *f* of the pinion *b*. In the case supposed, where the teeth of the pinion *b* extend about one-half of the circumference,

and the diameters of the gear-wheels are equal, there are two lock-teeth, *e e'*, diametrically opposite each other on the cog-wheel *a*, thus separating the toothed circumference into equal parts, each of which has the same number of cogs as are on the pinion *b*. If the pinion *b* in Fig. 1 is rotating to the left—in the direction of the arrow *i*—the teeth *g*, meshing with the teeth *g'*, will rotate the cog-wheel *a* until the last tooth on the pinion has passed the last tooth on the driven wheel and the convex portion *f* has come into contact with the concave locking-tooth *e'*. This will immediately stop the wheel *a*, and will hold it stationary, while the untoothed part of the pinion revolves against the concave locking-tooth *e'*. When, however, the first tooth of the pinion has reached the side of the locking-tooth, the convex surface *f* will have been disengaged therefrom, and the wheel will be rotated for another semi-revolution, as before. In this manner the driven wheel *a* will have equal alternate periods of rotation and rest, and will perform one semi-revolution during each complete revolution of the pinion *b*.

The modification illustrated in Fig. 2 is designed to produce an intermittent motion of the driven wheel twice during each rotation of the pinion *b*, and to completely turn the driven wheel as often as the pinion is turned. This is done by making the pinion *b* of larger diameter than the driven wheel, and providing it with two sets of cog-teeth, 2 and 3, situate diametrically opposite to each other, each set having the same number of gear-teeth as there are on each part of the driven wheel *a*. On the periphery of the pinion *b* are two untoothed portions, *f f'*, opposite to each other and separating the two sets of teeth 2 3. The construction of the driven wheel *a* is similar to that shown in Fig. 1. If, now, the pinion *b* revolves to the left, starting from the position shown in Fig. 2, the untoothed convex face of the pinion will pass over the concave lock-tooth *e* without rotating the driven wheel until the first tooth of the toothed segment 2 reaches the side of the lock-tooth. The segment 2 will then turn the driven wheel one-half, until the next untoothed segment, *f'*, reaches the lock-tooth *e'*, when the driven

wheel will again come to rest. When the toothed segment 3 has turned the driven wheel another semi-revolution, the parts will be in the original positions, each having revolved once, and the driven wheel having had four periods of alternate rest and motion. As shown in the drawings, where the untoothed segments of the pinion *b* are of equal arcs and each a quadrant the periods of rest and motion will be equal in duration; but if these segments be made of unequal size one period of rest will last for a longer time than the other, as will be readily understood.

Fig. 3 shows a modification of my improvement, in which the driven wheel *a* requires six revolutions of the pinion *b* to rotate it once, and in which the driven wheel is operated during only a quarter-revolution of the pinion, and is locked during the remaining three-quarters thereof. This is done by providing the driven wheel with six locking-teeth, *e e' e" e" e" e"*, separated by six series of cog-teeth, *g'*, while the pinion *a* is smaller and has but one series of teeth, *g*, equal in number of cogs and length of arc to each of the series *g'*. When the series of cogs *g* extends over a quarter of the circumference, and the untoothed part *f* occupies the remainder, it is clear that the cogs *g* will rotate the wheel *a* one-sixth during a quarter of the rotation of the pinion, and that during the remaining period of the rotation of the pinion the part *f* will traverse the face of one of the lock-teeth without moving it.

From this description it will be apparent that my improvement may be modified indefinitely, so as to produce intermissions of motion of different duration and frequency with relation to the rotation of the continuously-rotating pinion. The variable elements to produce these modifications are the relative diameters of the pinion and driven wheel, the number and situation of locking-teeth on the driven wheel, and the number and situation of the series of cogs on the pinion *b*.

Fig. 4, 5, and 6 show that modification of my improvement illustrated in Fig. 1 applied to miter-wheels, there being no difference in principle or mode of operation, except that the toothed peripheries of both wheels, the concave locking-teeth, and the convex untoothed part of the pinion are correspondingly beveled. Any of the modifications of my improvement may thus be applied to shafts inclined at any desirable angle to each other.

It will be noticed that in each figure of the drawings the concave parts *f* of the pinion terminate at both ends in an inclination, *h*, toward the base of the teeth *g*. The object of

the recess thus formed is to permit the convex face *f* to pass the middle of the locking-tooth, and to release it just before the first cog *g* engages the side of this tooth and commences to revolve the wheel.

The principal advantages of my improvement are its simplicity and certainty of operation. The extent of the locking-teeth and of the untoothed parts of the pinion which engage them are sufficient to compensate for any slight inaccuracy in their manufacture or adjustment, and I am thus enabled to overcome the difficulties and dangers incident to the use of the ordinary mutilated cogs. The action of the locking-teeth is such as to stop the driven wheel and to resist the impetus of its driven parts immediately, thus preventing lost motion and dispensing with the necessity for the use of any independent stop or lock. The mechanism operates easily and certainly and without unnecessary jar or noise.

I do not desire to limit myself to the use of a plurality of any particular number of the parts *f* or locking-teeth *e*; but

What I claim as my invention, and desire to secure by Letters Patents, is—

1. A driven gear-wheel whose periphery is provided with a series of the usual gear-teeth and a lock-tooth having a concave bearing-face, in combination with a gear-wheel having a series of gear-teeth corresponding to the series on the said driven wheel and a convex arc whose radius is less than the radius of the toothed segment of the same gear-wheel, including the cogs thereof, said convex arc being the counterpart of the said concave locking-tooth, so as to be capable of bearing against the same, substantially as and for the purposes described.

2. A driven gear-wheel whose periphery is provided with several series of the usual gear-teeth and several locking-teeth having concave bearing-faces, in combination with a gear-wheel having a series of gear-teeth corresponding to the series on the said driven wheel and having part of its periphery convex, said convex part having a radius less than the radius of the toothed portion of the same gear-wheel, including the cogs thereof, and being the counterpart of the said concave locking-teeth, so as to be capable of bearing against the same, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 24th day of November, A. D. 1884.

HERMANN SCHULZE-BERGE.

Witnesses:

W. B. CORWIN,
THOMAS W. BAKEWELL.