2 Sheets—Sheet 1.

N. P. OTIS.

OSCILLATING GEARING.

No. 191,705. Patented June 5, 1877.

Fig. 1.

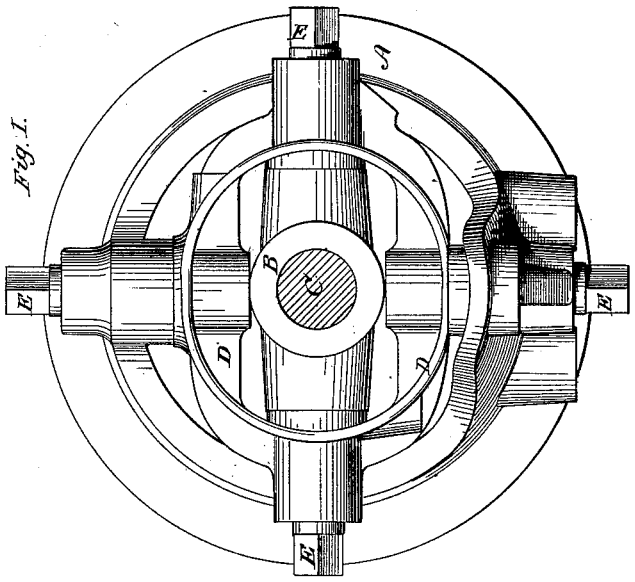
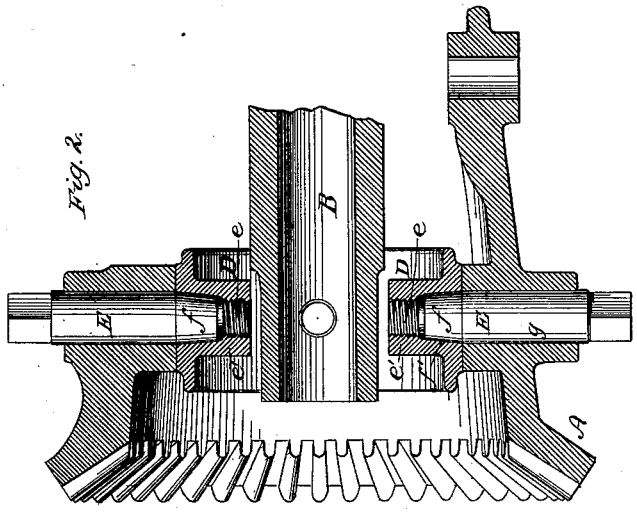


Fig. 2.



Witnesses:

C. Clarence Poole

N. B. Smith

Inventor:

Norton P. Otis

By his atty R. D. Smith

2 Sheets—Sheet 2.

N. P. OTIS.

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Fig. 4.

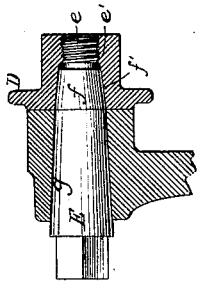
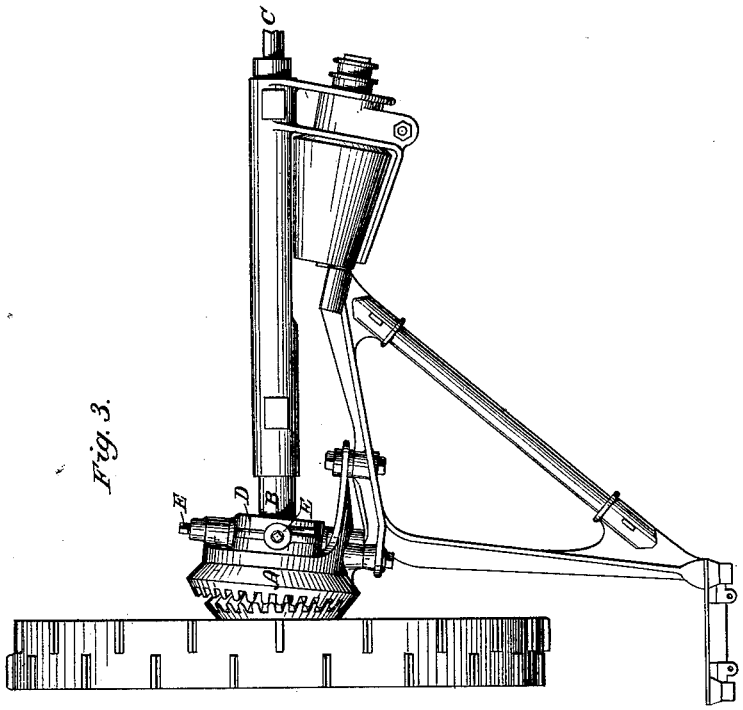


Fig. 3.



Witnesses:

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Inventor:

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R. D. O. Smith

UNITED STATES PATENT OFFICE.

NORTON P. OTIS, OF YONKERS, NEW YORK, ASSIGNOR TO R. DUTTON & CO., OF SAME PLACE.

IMPROVEMENT IN OSCILLATING GEARINGS.

Specification forming part of Letters Patent No. **191,705**, dated June 5, 1877; application filed April 25, 1877.

To all whom it may concern:

Be it known that I, NORTON P. OTIS, of Yonkers, Westchester county, State of New York, have invented an Improvement in Oscillating Gear, of which the following is a specification:

This invention relates to a new and improved method of making a pin or bolt for connecting two metallic pieces so as to form a hinge or joint, with the joint-pin rigid in one part and loose in the other, and is more particularly applicable to the joint-pin used in what is called a "gimbal-joint," or to oscillating movements where the tendency would be to work the joint-pin loose in its seat, and is especially desirable when it is frequently necessary to remove and replace the pin which forms the joint. Heretofore this latter operation has been exceptionally troublesome and difficult.

That others may fully understand my invention and improvement, I will particularly describe it, having reference to the accompanying drawings, wherein—

Figure 1 is a plan view of an oscillating gear-wheel, gimbal-joint, and axle-box, having my improvement. Fig. 2 is a transverse section, showing the structure of the joints. Fig. 3 is a plan, showing mode of connection to drive the cutters of a mower. Fig. 4 is a transverse section, showing modified joint.

The mode of operation of the devices herein shown and alluded to is as follows: A is the oscillating gear-wheel. B is the main shaft-box, whereby the oscillating gear-wheel A is kept in place upon the main axle C. D is the intermediate cross-axis box or gimbal, whereby oscillating motion is permitted to the gear-wheel A. The construction of these parts is well understood, and needs no more particular description. The structure of the joint-bolts and seats, being all alike, will require only a particular description of one.

The relative motion of the parts A, B, and D is a small quantity, and it is therefore evident that a small quantity of lost motion in the joint-bolt seats will defeat the purpose of the apparatus, and it is therefore necessary that the parts should fit with accuracy.

Heretofore the joint-bolts E E were made cylindrical throughout, and one hole in one of the parts forming the hinge was bored slightly smaller than the other, so that the end of the pin E would have to be driven into it in order to form a tight fit. The hole in the other part, being a little larger, allowed it to move freely upon the pin. But joints constructed in this way are very difficult to take apart with facility, as there is no means of readily removing the pins; and a more objectionable feature still is that, when the pin has been removed and replaced a few times, it ceases to fit snugly in the hole, and from wear becomes loose, and destroys the accurate working of the joints. Instead of driving in that end of the pin which I wish to have form with the part a tight joint, I turn down a portion of the end *e* to a smaller size than the body of the pin, and cut a thread upon it, and tap a corresponding thread in the part *e'*, made to receive it, the remaining portion of the pin, which the part having the thread in is to receive, is turned tapering or conical, *f'*, and a corresponding hole bored in the box.

When the pin E is screwed into its seat tightly, the taper *f* will fit snugly the tapering hole *f'*. In order to remove or replace pin E, all that is necessary is to screw or unscrew that part represented by thread *e*. The taper *f* prevents the pin E from becoming loose in its seat *f'*, from wear, by reason of repeated removals, as above set forth, as the parts now will always become tight when the pin E is screwed tightly. The working surface *g* of the pin E may be cylindrical or conical, as preferred.

Having described my invention, what I claim as new is—

1. A hinge-joint pin, E, with a screw-thread and a conical bearing at its end, fitting into a corresponding seat, in combination with the movable part of said joint, having its bearing upon the body of the pin E, substantially as shown, and for the purpose described.

2. An oscillating gear-wheel, A, combined with the gimbal-ring D and joint-pins E E, having conical ends *f*, and screw-threads to fit corresponding seats *f'*, as and for the purpose set forth.

3. An oscillating gear-wheel, A, and the taper-seated joint-pins E E, combined with the oscillating gimbal-ring D, in which, also, two of said pins are supported to form a joint having universal movements, substantially as and for the purpose set forth.

4. The oscillating gear-wheel A, gimbal-ring D, and taper-seated joint-bolts E, in combination with the main frame of a mowing-machine, substantially as and for the purpose described.

NORTON P. OTIS.

Witnesses:
THEODORE FITCH,
CH. OCHLEY.