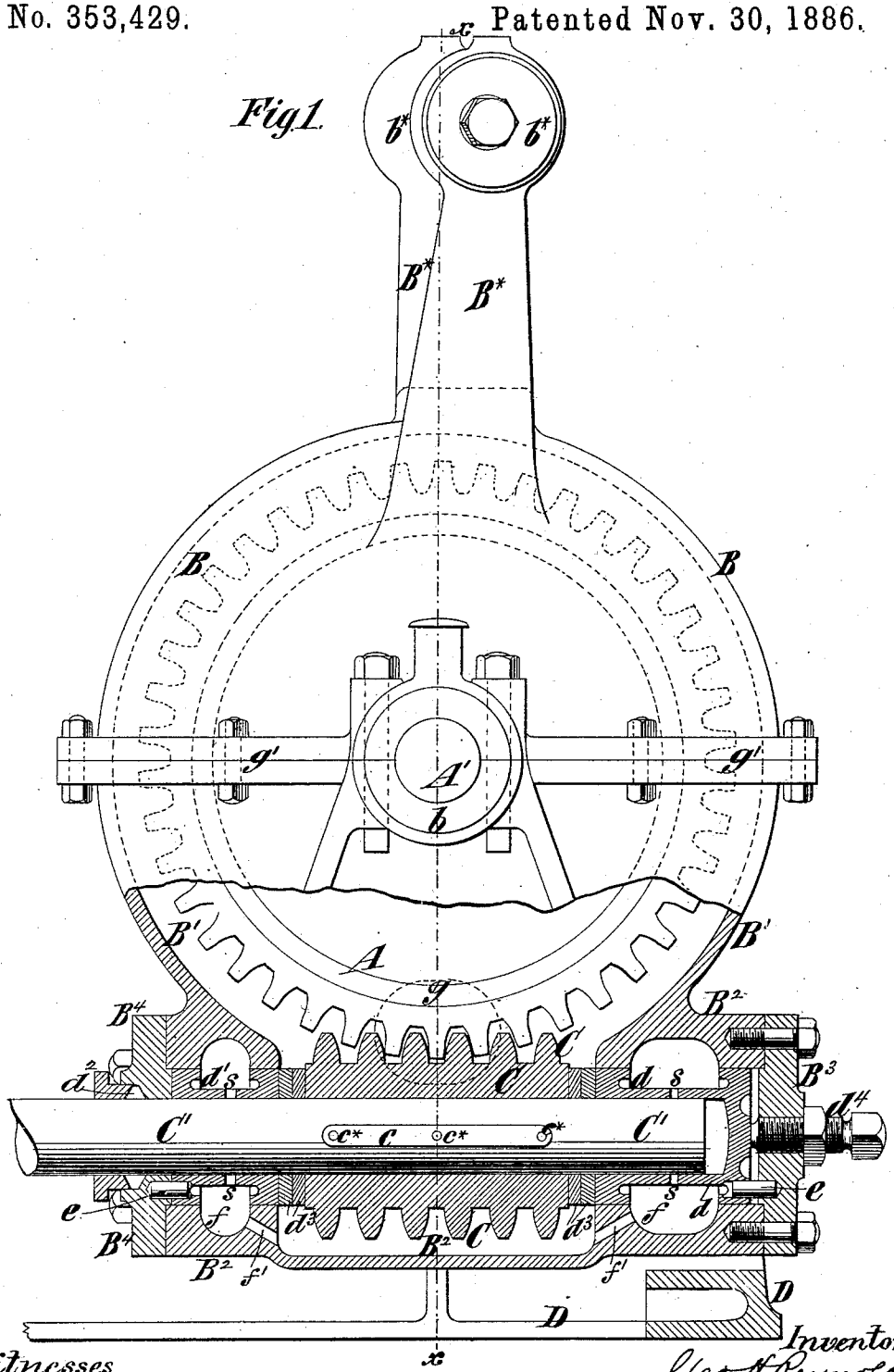
(No Model.) 2 Sheets—Sheet 1.

G. H. REYNOLDS.

WORM GEARING.

No. 353,429. Patented Nov. 30, 1886.

Fig 1.



Witnesses.
Emil Certa.
C. Sundgren

Inventor
Geo. H. Reynolds
by his Attys
Brown & Hall

N. PETERS, Photo-Lithographer, Washington, D. C.

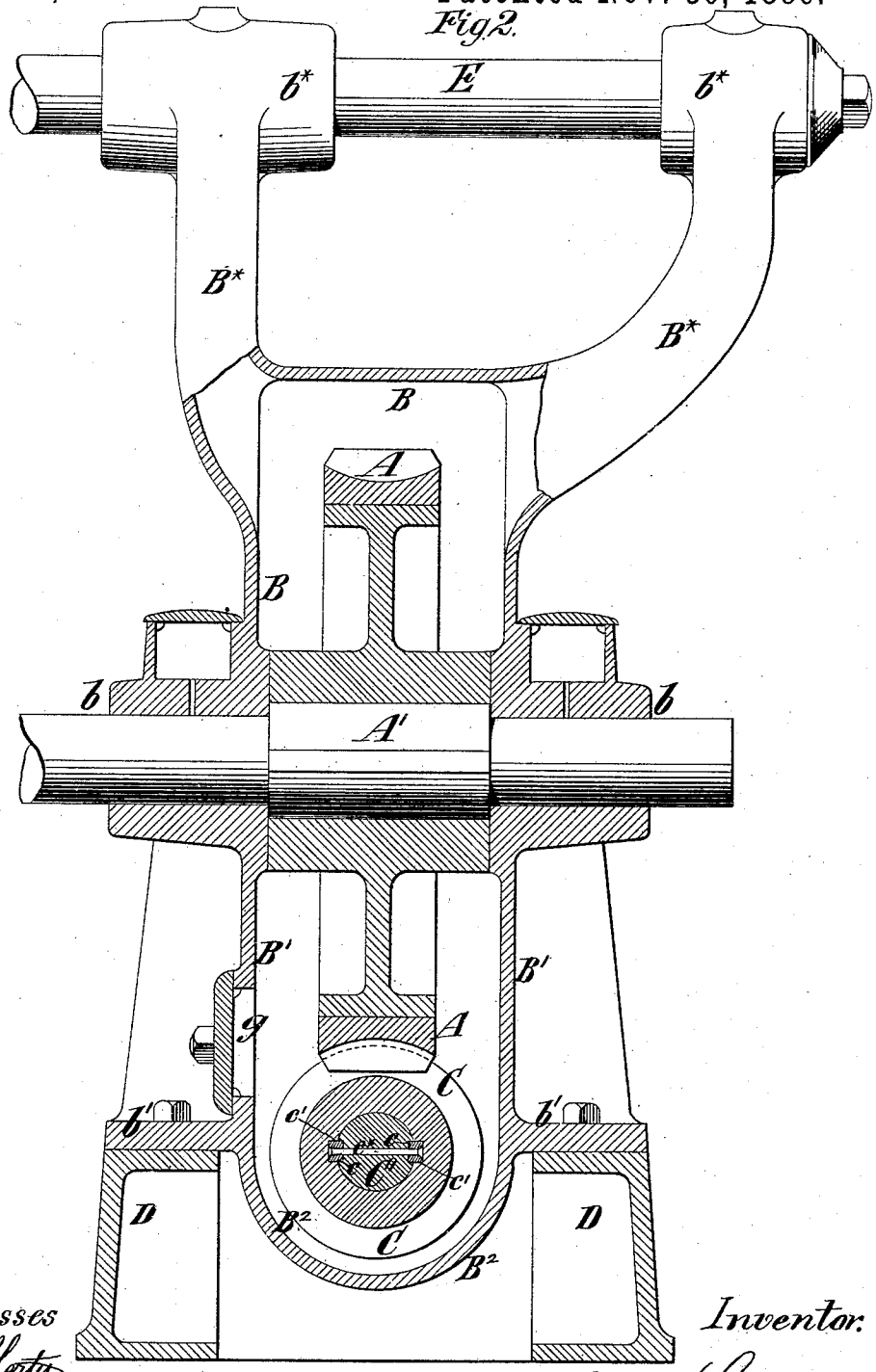
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WORM GEARING.

No. 353,429. Patented Nov. 30, 1886.

Fig 2.



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UNITED STATES PATENT OFFICE.

GEORGE H. REYNOLDS, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO THE CRANE BROTHERS MANUFACTURING COMPANY, OF CHICAGO, ILL.

WORM-GEARING.

SPECIFICATION forming part of Letters Patent No. 353,429, dated November 30, 1886.

Application filed February 13, 1886. Serial No. 191,797. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. REYNOLDS, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Worm-Gearing, of which the following is a specification.

In constructing worm-gearing for elevators and other purposes the worm-wheel and worm or screw are often inclosed entirely within a casing, the lower portion of which is oil-tight, so that the worm and the portions of the wheel which successively engage therewith may be immersed constantly in an oil-bath, which will reduce friction and consequent wear.

My invention consists in a novel construction and combination of the worm or screw and its shaft, whereby the endwise movement of the worm, which results necessarily from the wear on its stationary thrust-bearings at the ends of the worm, is prevented from being communicated to the shaft, and hence prevents an engine, which may be coupled with the shaft, from being thrown out of line.

The invention also consists in a novel construction of the worm-case and shaft-bearings and thrust-bearings, whereby copious lubrication of the shaft-bearings, as well as the worm, is provided for.

The invention also consists in a novel construction of the worm-case and shaft-bearings, whereby the end-play produced by wear of the thrust-bearings at opposite ends of the worm may be perfectly taken up by a single set-screw.

The invention also consists in novel features in the construction of the casing which contains the worm-wheel and worm, as hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a sectional elevation of worm-gearing and a casing therefor embodying my invention; and Fig. 2 is a vertical section thereof on the plane of the dotted line *x x*, Fig. 1.

Similar letters of reference designate corresponding parts in both figures.

A designates the worm-wheel, having a shaft, A′, which is mounted in suitable bearings, *b*, in the worm-wheel case B B′; and C designates the worm or screw on a shaft, C′, and arranged in the worm or screw case B^2. The worm-wheel case consists of an upper semicircular portion, B, and a lower semicircular portion, B′, formed integral with the worm or screw case B^2. The casting composing the lower portion, B′, of the worm-wheel case and the worm or screw case B^2 is provided on opposite sides with laterally-projecting flanges *b′*, whereby the whole casing is supported on timbers or a suitable metallic frame, D, forming no part of my invention.

The worm-shaft C′ may be connected directly with or be a part of the engine-shaft, whereby the worm is rotated, or may be provided with pulleys or gears, whereby it is driven.

The worm C is locked to turn with its shaft C′, but is free to slide thereon, and its connection with the shaft is effected, as here shown, by two feathers or ribs, *c*, on the shaft engaging grooves *c′* in the worm, as shown in Fig. 2. The endwise shifting of the worm, which will take place by reason of wear on the thrust-bearings, will then have no effect on the shaft and will not shift it endwise. This is advantageous, as when an engine is coupled directly with the shaft such movement of the shaft would throw the engine out of line. As here represented, the feathers or ribs *c* are separate pieces, secured on the shaft, as shown in Fig. 2, by means of rivets *c**, inserted directly through the shaft.

The journals of the shaft C′ are supported in bearings *d d′*, which are here shown as formed in bushings made separate from the worm-case B^2 and fitted to cylindric seats therein. The ends of the case are provided with heads or bonnets B^3 B^4, the latter of which has in it a stuffing-box and gland, d^2, to prevent oil from leaking out around the shaft. Between opposite ends of the worm C and the ends of the bearings *d d′* are placed washers or collars d^3, which may be of steel and which may be readily replaced in case of wear. As clearly shown in Fig. 1, the bearing or bushing *d* at one end of the shaft is closed at the outer end, and against it bears a set-screw, d^4, fitted in the head or bonnet B^3. By tightening the single screw d^4 the wear on the thrust-bearings at the ends of the screw or worm C may be taken up. The bushings *d d′* may be prevented from turning by means of studs *e*, connecting them with the heads or bonnets B^3

B^4. The bushings *d d'* have in them openings *s*, and are surrounded by supplemental oil-chambers *f*, which, by means of passages *f'*, communicate with the main oil-chamber, which contains the worm C. I have represented a filling hole or opening, *g*, in the side of the worm-case B', closed by a cap or cover, as shown in Fig. 2, and through this opening oil may be introduced to fill the worm-case B^2 and the supplemental chambers *f*, from which oil will freely flow to the bearings of the shaft C'.

As before stated, the parts B' B^2 of the casing are formed integral, and are secured to the upper part, B, by a flanged joint, *g'*, or otherwise.

I have represented the upper part of the casing as formed integral with standards B*, which project upward and support bearings *b** for an upper drum-shaft, E; or such standards may be made separate from and secured upon the part B of the casing.

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

1. The combination, with a shaft and a worm which is constantly locked to turn with the shaft, but is free to slide on the shaft, of a casing containing the worm and shaft and comprising bearings wherein the shaft may turn, and stationary thrust-bearings for the opposite ends of the worm, substantially as herein described.

2. The combination, with a worm and shaft, thrust-bearings for the worm, and bearings for the shaft, which are provided with transverse oil-holes leading to their inner surfaces, of an oil chamber or reservoir wherein the worm turns and in which are the thrust-bearings, and which is in communication with the transverse oil-holes in the shaft-bearings, whereby lubrication of the worm or shaft bearings and the thrust-bearings is insured, substantially as herein described.

3. The combination, with the worm and shaft C C', of the oil-case B^2, containing the worm and comprising bearings for the shaft, and supplemental oil-reservoirs *f*, surrounding the shaft-bearings and communicating by holes *s* with the inner surfaces of the shaft-bearing, and also communicating with the main oil-reservoir B^2, substantially as herein described.

4. The combination, with a worm and its shaft, of a worm-case having at one end a bearing for the shaft and a thrust-bearing for the worm, a bushing movable in the case and forming a bearing for the other end of the shaft and a thrust-bearing for the worm, and a set-screw bearing on the bushing, and serving by its adjustment to take up wear in both thrust-bearings, substantially as herein described.

5. The combination, with a worm and its shaft, of the case B^2, closed at the ends by heads B^3 B^4, and containing at the ends removable bushings *d d'*, forming bearings for the shaft and thrust-bearings for the worm, and a single set-screw, d^4, inserted in the head B^3 and bearing on the bushing *d*, and serving to take up wear in both thrust-bearings, substantially as herein described.

6. The combination, with a worm-wheel, A, and a worm and shaft, C C', of a case for the worm-wheel, composed of the upper portion, B, and the lower portion, B', having formed integral with it the case B^2 for the worm, substantially as herein described.

7. The combination, with a worm-wheel, A, and a worm and shaft, C C', of a case for the worm-wheel, composed of the upper portion, B, and the lower portion, B', having formed integral with it the case B^2 for the worm, and standards projecting upward from the upper case portion, B, and supporting bearings for an upper drum shaft, substantially as herein described.

GEO. H. REYNOLDS.

Witnesses:
C. HALL,
FREDK. HAYNES.