A. SUNDH.

GEARING.

APPLICATION FILED SEPT. 5, 1911.

1,017,819.

Patented Feb. 20, 1912.

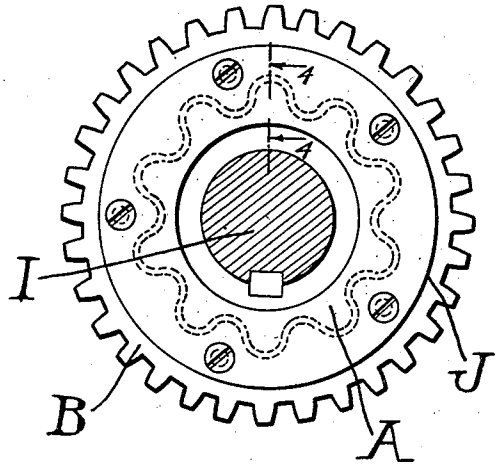

Fig. 1.

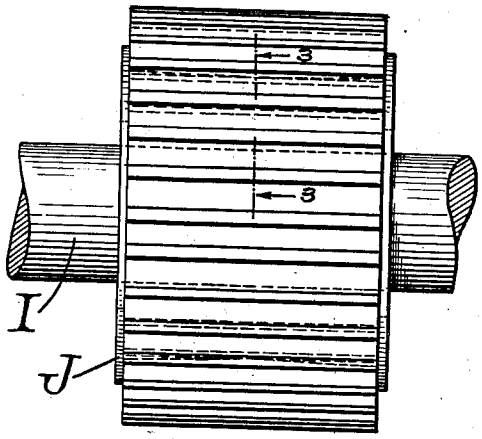

Fig. 2.

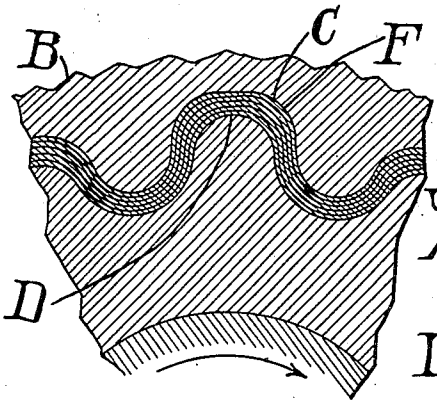

Fig. 3.

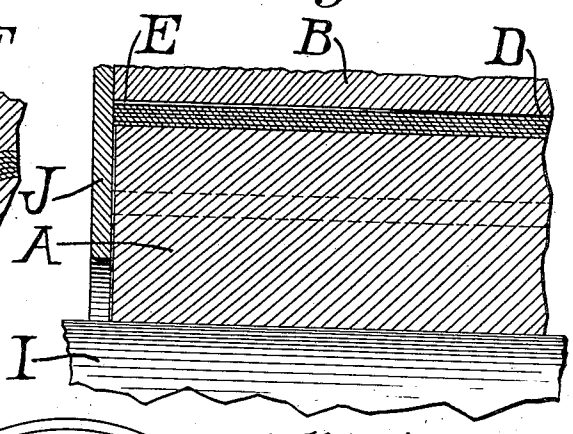

Fig. 4.

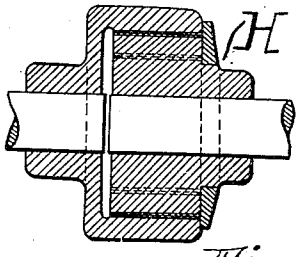

Fig. 6.

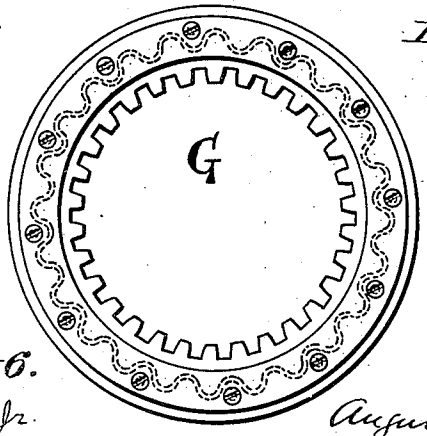

Fig. 5.

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UNITED STATES PATENT OFFICE.

AUGUST SUNDH, OF HASTINGS-UPON-HUDSON, NEW YORK, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

GEARING.

1,017,819. Specification of Letters Patent. Patented Feb. 20, 1912.

Application filed September 5, 1911. Serial No. 647,464.

To all whom it may concern:

Be it known that I, AUGUST SUNDH, of Hastings-upon-Hudson, county of Westchester, State of New York, have invented a new and useful Improvement in Gearing, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved yieldable, self-alining gear, which is simple and compact in construction, and effective in operation.

The invention consists of certain parts, details and combinations of same as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawing forming a part of the specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side view of a toothed gear with my invention applied thereto. Fig. 2 is a front view of Fig. 1. Fig. 3 is a sectional view, on line 3—3, Fig. 2. Fig. 4 is a sectional view, on line 4—4, Fig. 1. Fig. 5 is an end view of my invention applied to an internal toothed gear or annulus. Fig. 6 is a sectional view of my invention applied as a coupling.

My improved gear is comprised of substantially three elements or parts, to wit: an inner or central element, indicated by reference letter "A" on the drawing, an outer element or part, indicated by the reference letter "B" on the drawing, which outer element surrounds the inner element, and an intermediate element C. The outer periphery of the inner element and the inner periphery of the outer element are corrugated or waved, the corrugations on the faces of the respective parts being substantially of corresponding shape, so that the inner part or element upon being rotated will impart its motion to the outer part or the outer part being rotated will impart its motion to the inner part. The corrugations are transverse of the periphery of the two elements, and there is a clearance space left between the opposing faces of the parts, in which there is placed the third part or element, "C," consisting of a strip or band of metal, preferably steel, which strip may be of sufficient thinness to be wound or otherwise placed in the clearance space, in a single layer; or the clearance space between the parts, A and B, may be of sufficient dimensions to allow the strip of metal to be wound in the clearance space a number of times. I have indicated on the drawing, see Figs. 3 and 4, for instance, the strip, C, as being wound in a number of layers between the parts, A and B. I preferably enlarge the clearance space, beginning at about the middle D of the corrugations of the parts, A and B, and flaring outwardly to the sides of those parts as indicated by the reference letter, "E." The flaring may be in one, or both of the parts, A and B. This flaring feature practically amounts to a nearer approach of the parts, A and B, to each other at substantially a point, "D," Figs. 3 and 4, included in a median line drawn around the circumferences of those two parts. Now, by closely packing the strip between the two parts, A and B, at the point or points of their nearest approach, there is obtained, in effect, a pivotal point, about which there may be, and in some cases will be, a slight pivotal or rocking movement of the parts, A and B, relatively to each other, thereby permitting the gear to aline itself. This feature is carried out in the construction of my gear by having the apex of the corrugations at the median line, slightly closer to the opposing concavities or bottoms than at the sides of the corrugations in the parts, A and B, as clearly shown in Fig. 3. I enlarge that portion of the clearance space between the sides of the corrugations, by lessening the height of the shoulders of the corrugations, or by increasing the depth of the opposing concavities or bottoms, as clearly shown in Fig. 3, at the locality "F." This feature secures a yielding relation between the parts, A and B, since it allows a relative movement between those parts. Further to explain; let it be imagined that motion is imparted to the inner part A in the direction of the arrow, Fig. 3. The corrugations on the part, A, will press against the strip, C, substantially in the direction of the arrow, and by reason of the fact that the strip, C, does not occupy all the space in that portion of the clearance space substantially opposed to the shoulder of the corrugations on the part A, the strip C will be moved by the part, A, until the strip is pushed firmly against the opposing corrugations on the part, B. Thus it will be seen that by this feature I have obtained a yielding, or yieldable, gear.

I have also shown my invention applied to an internal toothed annulus, or gear, "G," Fig. 5, and also applied as a coupling, H, Fig. 6, the application thereto being so plain as not to require any further textual description.

While I have shown the outer element, B, in Fig. 1, as a toothed gear, it is plain that the part B might be shown as having a plain outer periphery instead of a toothed periphery, to be used as a friction or belt gear. It is also plain that I might have shown the parts, A and B, as having the corrugations extending from their lateral faces and engaging each other. While I have shown the corrugations rounded, it is plain that they may be of any suitable form.

The part A is shown in Figs. 1, 2, 3, and 4, as keyed to a shaft, "I," and there is a face plate, "J," which is shown secured fast to the part B, with a slight clearance between the plate and the part A, and the shaft, I. It will be observed that the face plate serves to retain the part B in position with respect to the part A and the strip C between the parts A and B, and yet allows any relative movement by the parts A, B, C, and I.

I am aware that it has been proposed to use rubber or springs between driving and driven parts; but they have not been arranged, so far as I am aware, to allow the driven part to be self-alining without, at the same time, allowing the axis of the driven part to be changed. This feature of alinement is of course highly important in gears; it would appear that rubber or a spring cannot be successfully used for this purpose, because the center of the axis of the gear must remain fixed, whereas rubber or a spring will allow the center of the axis of the driven part of the gear to be changed under the strain of the application of power to it, both by the inner part of the yieldable gear, and the resistance offered by the gear to be driven by the outward part of the yieldable gear. I have successfully taken care of this objection to rubber or a spring by using a metal strip closely packed in between the apex of the corrugations and the concave opposing surfaces, all of which I have described. Nevertheless, I have obtained a yieldable gear, as is obtained by the use of rubber or a spring, notwithstanding the fact that I use a metal strip. I obtain the yieldable feature by enlarging the opposing sides of the corrugations, thereby permitting a slight movement of the strip in that portion of the clearance space by the movement of the inner part of the gear relative to the outer part of the gear. It will thus be seen that I eliminate all the objections to the use of rubber or a spring by using a metal strip; and retain all the advantages of the use of rubber or a spring, and the added advantage over them of a self alining gear. Furthermore, the strip is spring tempered and retains its original dimensions and generally, I have found it to act better than rubber or a spring or any thing like them; and the gear will always therefore, aline itself perfectly.

Of course, various changes of the details might be made within the scope of my invention; I therefore wish not to be limited to the exact construction disclosed.

While I have disclosed my invention as comprising substantially three parts, it is obvious that the invention comprises any number of parts greater than three, for instance, the inner and outer parts may consist of two parts or any number greater than two, and if those parts shall consist of any number greater than two, a band may be placed between two of the opposing parts or between all of the opposing parts.

What I claim as new, and desire to secure by Letters Patent of the United States, is:—

1. In a device of the class described, the combination of several parts or elements to be rotated, having corrugations, with a clearance space between the corrugations on one part and the corrugations on another part; and a strip or band of elastic material in the space.

2. In a device of the class described, the combination of several parts or elements to be rotated, having corrugations, with a clearance space between the corrugations on one part and the corrugations on another part; and a strip or band of steel in the space.

3. In a device of the class described, the combination of several parts or elements to be rotated, having corrugations, with a clearance space between the corrugations on one part and the corrugations on another part; the space being narrower at the median circumferential line of the two parts than at the end circumferential lines of the said two parts; and a strip or band of material in the space and occupying all the narrow portion or part of the space; the part of the said strip in the narrower portion of the said space being unyielding to deformation.

4. In a device of the class described, the combination of several parts or elements to be rotated, having corrugations, with a clearance space between the corrugations on one part and the corrugations on another part; the space being narrower at the median circumferential line of the two parts than at the end circumferential lines of the said two parts; and a strip or band of steel in the space, and occupying all the narrow portion of the said space.

5. In a device of the class described, the combination of several parts or elements to be rotated, having corrugations, with a clearance space between the corrugations on

one part and the corrugations on another part; the space being narrower at the median circumferential line of the two parts and flaring outward to the sides of the two parts; and a strip of steel in the clearance space; that portion of the strip in the narrower part of the space occupying all the space there; and that portion of the strip not in the narrow part of the clearance, not occupying all the space, but being free to be moved, more or less, in that part of the space, from or toward the axial center of the said outer and inner parts.

6. A gear, comprising inner and outer parts, separated from each other, with a clearance space therebetween, the opposing faces of the parts being corrugated to correspond substantially, to each other, and the outer face of the outer part having gear teeth; and a strip of steel in the clearance space.

7. A gear, comprising inner and outer parts, separated from each other, with a clearance space therebetween, the opposing faces being corrugated to correspond substantially to each other; the clearance space being narrower at the median circumferential line of the said two parts than at the sides of the latter; and a strip of steel fitted closely in the narrower portion of the clearance space.

8. A gear, comprising inner and outer parts, separated from each other, with a clearance space therebetween, the opposing faces being corrugated to correspond substantially to each other; the clearance space being wider between the sides of the opposing corrugations than between the top of a corrugation on one of the said parts and the concavity opposite to the top in the other parts; and a strip or band of steel in the clearance space, not occupying all the wider part of the said space.

9. A gear, comprising inner and outer parts, separated from each other to form a clearance space; the outer face of the outer part having gear teeth; the inner face of the outer part and the outer face of the inner part, being corrugated to correspond substantially to each other; the clearance space being narrower at the median circumferential line of the said two parts than at the sides of the latter; and the clearance space between the sides of opposing corrugations being wider than at the tops of the opposing corrugations; a strip of steel in the clearance space, fitted closely between the outer and inner parts along the median circumferential line, and more or less loosely in the space between the sides of the corrugations.

10. In the class of article described, a yieldable, self-alining gear, comprised substantially of an inner and outer part, separated from each other, but arranged to engage each other; and a strip of hard, elastic material placed between the said inner and outer parts.

11. In the class of article described, a yieldable, self-alining gear, comprised substantially of an inner and outer part, separated from each other, but arranged to engage each other; and a strip of hard, elastic material placed between the said inner and outer parts, and a face-plate secured to the inner part.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

AUGUST SUNDH.

Witnesses:
E. W. HALL,
WALTER C. STRANG.