(No Model.)

S. SIEBERT.

GEARING.

No. 304,464. Patented Sept. 2, 1884.

Fig. 1.

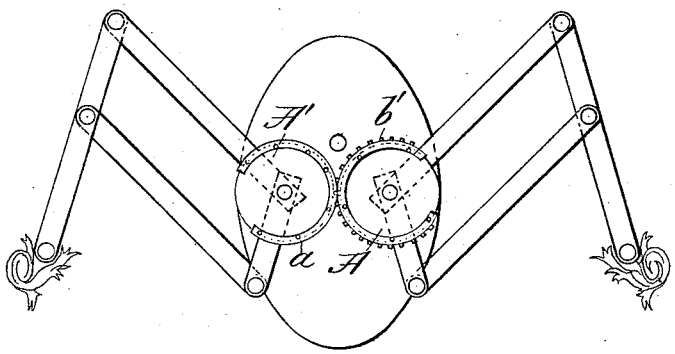


Fig. 2.

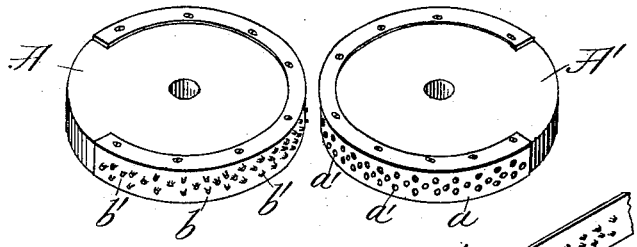


Fig. 4.

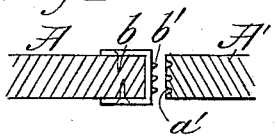
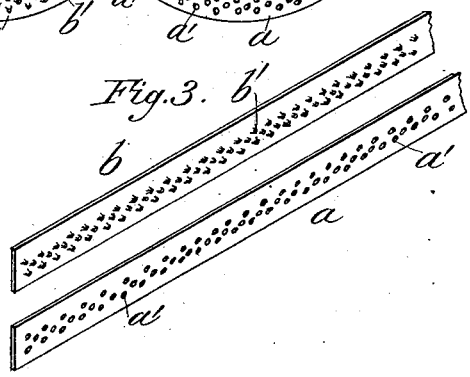


Fig. 3.



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UNITED STATES PATENT OFFICE.

SELMAR SIEBERT, OF READING, PENNSYLVANIA.

GEARING.

SPECIFICATION forming part of Letters Patent No. 304,464, dated September 2, 1884.

Application filed April 8, 1884. (No model.)

To all whom it may concern:

Be it known that I, SELMAR SIEBERT, a citizen of the United States, residing at Reading, in the county of Berks, and State of Pennsylvania, have invented certain new and useful Improvements in Gearing; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to certain new and useful improvements in gearing or cog wheels; and it consists in the peculiar construction of a pair of gear-wheels for the prevention of backlash or slipping of the gears in each other, as will be hereinafter more fully described, and then specifically pointed out in the claims.

In the annexed drawings, which fully illustrate my invention, Figure 1 is a plan view of a portion of a pantograph operated by means of my improved gear-wheels. Fig. 2 is a perspective view of a pair of gears constructed according to my invention. Fig. 3 is a perspective view of the metal bands, which are to be bent around the wheels to form the gearing; and Fig. 4 is a sectional detail of the wheels.

Like letters indicate like parts throughout the several views.

The letters A A′ represent a pair of gear-wheels, which are shown as applied to a reversing pantograph of the kind patented August 19, 1862, by C. L. Getz, No. 36,212. To these gear-wheels A A′ are connected, as shown in Fig. 1, the long and short arms, and also the arms for carrying the leading and copying pencil, in a similar manner to that described in the above-named patent. The actuating-wheels of the pantograph have sometimes been moved by means of thin metal crossed bands or belts, instead of using gears or cogs, which could not be made accurate enough to transmit the motion without play and friction, and which cause a greater or less disturbance in the pencils, which disturbance is apt to spoil the copy of the letter or drawing in reverse. These bands or belts, however, are apt to slip on the peripheries of the wheels. To overcome these difficulties, I employ wheels constructed as shown in Fig. 2. I take a thin strip or band, *a*, of copper or other suitable metal and perforate, indent, or engrave it at short and irregular intervals, as shown in Fig. 3. The holes or perforations *a′ a′* are of small size, and may or may not be all of one size. This metal strip *a* is next suspended in the bath of an electroplating apparatus, so that on this strip as a matrix will be formed or deposited another sheet or strip, *b*, of metal, which will have on one side or surface a number of points or projections, *b′ b′*, corresponding in number and size with the perforations or indentations in or on the strip *a*. The strips *a* and *b* are now removed from the bath in contact with each other or unseparated, and secured to the peripheries of the wheels A A′, as follows: The strip *a* is bent around the periphery of the wheel A′ and secured by overlapping its edges, which are held in place by means of screws or bolts, as shown in Fig. 2. Next the wheel A is placed in contact with the strip *b*, which is still in connection with the strip *a*. The strip *b* is then gradually withdrawn or separated from the strip *a* and bent around the wheel A, to which it is secured in a manner similar to that in which the strip *a* is secured. By leaving a few points *b′ b′* in connection at the meeting-point of the wheels A A′ the strips *a b* will be found to engage with each other very accurately when the wheels are revolved, and, from the small size of the points *b′*, and from their number and irregularity which correspond with the apertures *a′ a′*, there will be no slip or play in the movement of the wheels when reversing their direction, there being always several points *b′* in engagement with the strip *a*, thus insuring a smooth movement of the leading and copying pencils or points. Instead of using a perforated strip *a* from which to obtain the strip *b*, I may engrave, indent, or cut a number of small holes or patterns, irregular or otherwise, in the periphery of the wheel A′, as shown in Fig. 4, and place said wheel in the electroplating-bath and obtain a coating or deposit of metal around its periphery, which will enter or fill the holes or patterns in the wheel. After removing the wheel from the bath, I place it in contact with its fellow, then sever the metal coating at a

point diametrically opposite the point of contact between said wheels and bend it back and around the periphery of the wheel A, thus drawing the metal coating or strip *b* out of the holes or patterns in the wheel A′, but leaving several of the projections *b′* in the holes at the point of contact of the wheels and securing the strip to the wheel A in any suitable manner, so that the wheels will be found to gear very accurately.

In making gears for use in a reversing pantograph of the kind shown in the drawings, it is only necessary to form a part of the periphery of each wheel with intermeshing projections and indentations, as described, as the gears are not required to make a complete revolution. When depositing an indented disk or wheel in the electroplating-bath its sides must be protected in any suitable manner, so that the electroplating material will be deposited only on the periphery and in the indentations thereof. This method of forming gear-wheels secures great accuracy of mesh and effectually prevents slipping and backlash.

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

1. The gear-wheels A A′, having their peripheries provided with intermeshing perforations or indentations *a′ a′* and projections *b′ b′* irregularly placed, as described, whereby the gears are caused to mesh accurately without backlash, substantially as set forth.

2. The herein-described method of making gear-wheels, which consists in perforating, indenting, or engraving the periphery of a plain wheel or disk, then electroplating the periphery of said wheel or disk, then severing the strip of electroplated material and bending its ends backward over and around the periphery of a second wheel of like diameter, whereby the projections formed on the electroplate will register accurately with the corresponding indentations in the periphery of the first-named disk or wheel, and then securing said electroplated strip or band in position, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

SELMAR SIEBERT.

Witnesses:
F. H. SCHOTT,
F. E. TASKER.