

J. SAY.
 GEAR WHEEL.
 APPLICATION FILED JUNE 16, 1911.

1,028,909.

Patented June 11, 1912.
 3 SHEETS—SHEET 1.

Fig. 1.

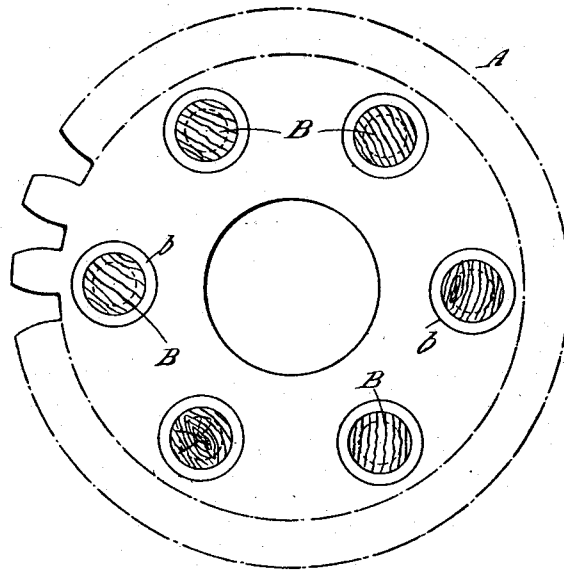


Fig. 2.

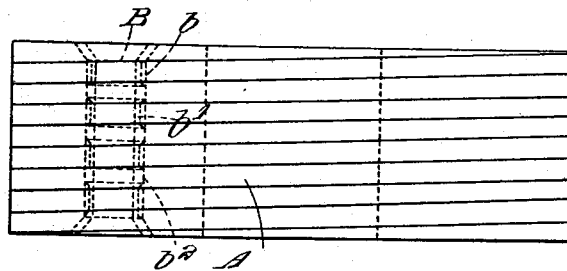
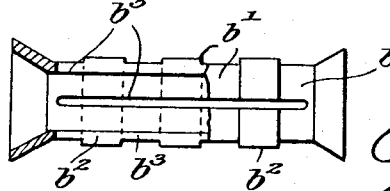


Fig. 2^a.



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Fig. 3.

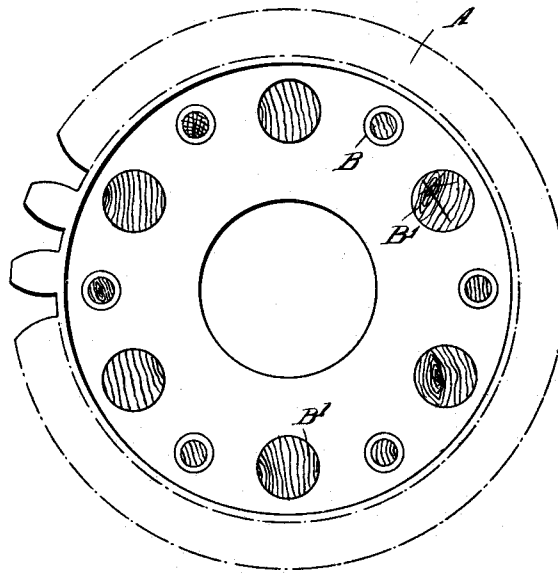


Fig. 4.

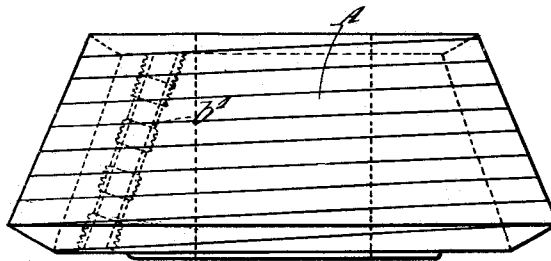
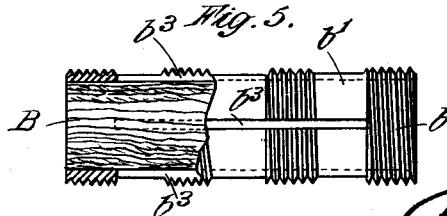


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 6.

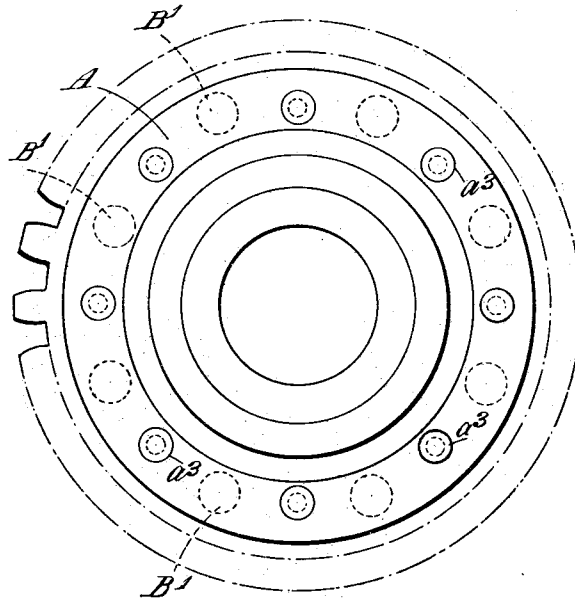
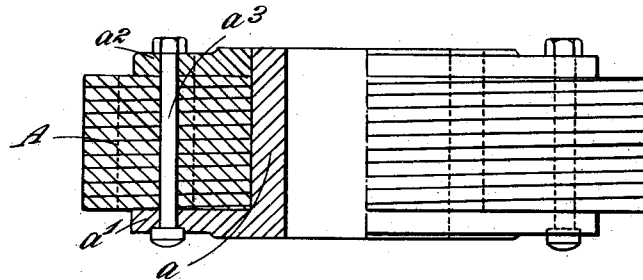


Fig. 7.



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UNITED STATES PATENT OFFICE.

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GEAR-WHEEL.

1,028,909.

Specification of Letters Patent. Patented June 11, 1912.

Application filed June 16, 1911. Serial No. 633,534.

To all whom it may concern:

Be it known that I, JAMES SAY, a subject of the King of Great Britain, residing at 9 Penleys Grove street, York, in the county of York, England, have invented certain new and useful Improvements in Gear-Wheels, of which the following is a specification.

This invention relates to gear wheels and has for its chief object to construct a gear wheel which will be silent in its action and possess great durability and will not be detrimentally affected by variations in atmospheric conditions. With a view to reducing noise it has hitherto been proposed to construct gear wheels from layers of fiber or of raw hide clamped together between metal plates but this construction is to a certain extent unsatisfactory by reason of the said materials being liable to be affected by changes in temperature, or atmospheric conditions with the result that the tooth formation is liable to be altered and the working of the gear wheel impaired.

According to this invention the gear wheel is manufactured from a strip of metal that is wound in the form of a coil the convolutions of which are arranged in contact with each other and are secured together if necessary in any suitable manner, the teeth being subsequently formed across the convolutions. Plugs of dried wood or other suitable material of a sound deadening nature, may be arranged to extend through the convolutions in suitable proximity to the teeth and at suitable intervals apart. In order to cause the convolutions to occupy a position in contact with each other the strip of metal from which such convolutions are formed is advantageously tapered in cross section toward that edge which constitutes the inner peripheral surface of the coil with the result that the strip becomes rectangular in cross section when wound owing to the strip being put into tension and compression on opposite sides of the neutral line. The strip so formed is conveniently wound while hot upon a mandrel of suitable dimensions in such a manner that the convolutions lie in contact with each other, the contraction of the metal as it cools causing the convolutions to be firmly pressed together. After the coil has cooled it may be subjected to a pickling process in order to remove any scale or other deposit

that may have collected upon the surface of the metal during the heating process, the convolutions of the coil being temporarily opened in any suitable manner in order to enable the pickling process to be satisfactorily performed. After this operation has been effected the ends of the coil may be faced and the convolutions secured together if found necessary. The coil can then be machined to the required size and the teeth formed across the convolutions thereof.

In order that the said invention may be clearly understood and readily carried into effect, the same is described more fully with reference to the accompanying diagrammatic drawings, in which:—

Figure 1 is an elevation, and Fig. 2 an edge view of a spur wheel constructed in accordance with this invention. Fig. 2^a is an elevation partly in section of a metallic sleeve having spaced bearing surfaces. Figs. 3 and 4 are similar views to Figs. 1 and 2 showing a form of the invention applied to a bevel wheel, and Fig. 5 is a detached view of a wooden plug combined with a metal sleeve having spaced bearing surfaces, in this case provided with screw threads. Figs. 6 and 7 illustrate a modified construction of spur wheel.

A represents the coil, and B the wooden plugs. In the example shown in Figs. 1 to 4 the coil A constitutes the complete gear wheel. In Figs. 1, 2 and 2^a the wooden plugs B are combined with metal sleeves *b* adapted to support each alternate convolution. For this purpose a number of channels *b'* are turned in each of the sleeves to form plain cylindrical collars *b*² which are so spaced and arranged as to bear against each alternate convolution. Longitudinal slots *b*³ extend through the greater part of the sleeves. The ends of the sleeve are then expanded into counter-sunk holes formed in the end faces of the coil and the aforesaid dried wooden plugs are driven through the sleeve thereby causing the collars *b*² to be forced into intimate contact with the adjacent portions of the convolutions.

In the example shown in Figs. 3 and 4 the holes that are formed in the convolutions A to receive the sleeves *b* are tapped, and such sleeves are threaded externally throughout their entire lengths. A number of channels *b'* are then turned in the sleeve, each channel approximately corresponding in width

to the thickness of one convolution and being spaced from the preceding channel by a space that is also approximately equal to the thickness of one convolution. The sleeve so formed is then slotted at b^3 for a portion of its length, Fig. 5, and is screwed through one of the holes in the coil until the threaded portions of the sleeve engage with each alternate convolution, as shown in Fig. 4, the other convolutions which register with the channels in the sleeve remaining out of contact with the latter. The dried wooden plug B is now driven through the sleeve thereby causing its threaded portions to be expanded into intimate contact with the threaded portions of the convolutions. The sleeves constructed in the manner above described are secured in the convolutions in such a manner that alternate sleeves engage with alternate convolutions.

If desired additional wooden plugs B' may be interposed between the plugs B or the plugs B' may be substituted for the plugs B that is to say for plugs combined with metal sleeves.

In the arrangements above described the coil has constituted the complete gear wheel but in some cases it may be more convenient for the coil to form a portion of the gear wheel only. An example of this kind is illustrated in Figs. 6 and 7 in which the coil A comprises an annular ring that is mounted upon a hub or body portion a and is clamped between a fixed flange a' and a movable flange a'' by bolts and nuts a^3 , the aforesaid wooden plugs being inserted through the convolutions between the bolts a^3 .

The invention hereinbefore described can be applied with advantage to all types of spur and bevel gearing in which silence in running is a consideration.

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

1. A gear wheel comprising a continuous strip of metal wound edgewise in the form of a coil and having the teeth extending across the convolutions thereof.

2. A gear wheel comprising a continuous strip of metal wound edgewise in the form of a coil and having the teeth extending

across the convolutions thereof and means for securing the convolutions together.

3. A gear wheel comprising a strip of metal wound in the form of a coil and having the teeth extending across the convolutions thereof, and plugs of a sound deadening material extending through holes formed in the metal strip across the convolutions thereof.

4. A gear wheel comprising a strip of metal wound in the form of a coil and having the teeth extending across the convolutions thereof, and plugs extending through holes formed in the metal strip across the convolutions thereof and formed with spaced bearing surfaces arranged to bear against each alternate convolution of the coil.

5. A gear wheel comprising a strip of metal wound in the form of a coil and having the teeth extending across the convolutions thereof, metal sleeves extending through holes formed in the metal strip across the convolutions and formed with spaced bearing surfaces arranged to engage with each alternate convolution and plugs of a sound deadening nature driven into the said sleeves so as to expand the aforesaid bearing surfaces into intimate contact with the adjacent portions of the convolutions.

6. A gear wheel comprising a strip of metal wound in the form of a coil and having the teeth extending across the convolutions thereof, metal sleeves screwed through threaded holes formed in the metal strip across the convolutions, each of the said sleeves being slotted for a portion of its length and formed with threaded bearing surfaces arranged to engage with each alternate convolution of the coil, and plugs of a sound deadening nature driven into the said sleeves so as to expand the aforesaid bearing surfaces into intimate contact with the adjacent portions of the convolutions.

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

JAMES SAY.

Witnesses:

L. E. BUCKLEY,
CHARLES E. TAYLOR.