A. G. HEINLE.
Gearing.

No. 214,821. Patented April 29, 1879.

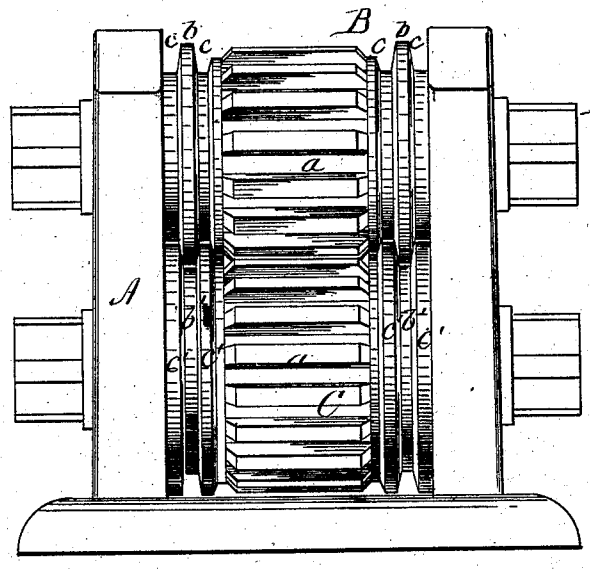


Fig. 1

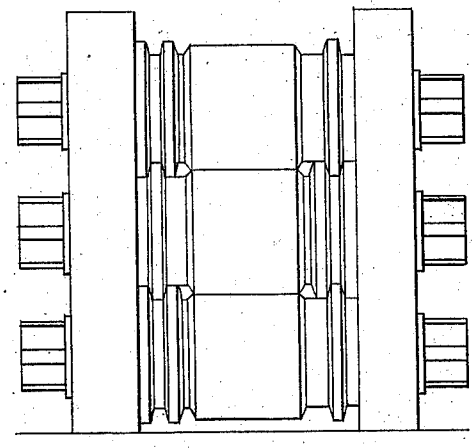
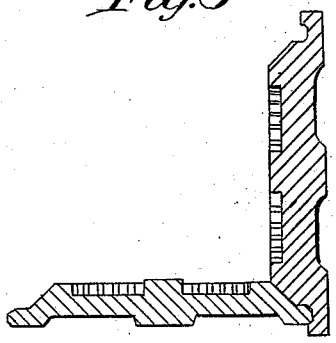


Fig. 2

Fig. 3



Witnesses.
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UNITED STATES PATENT OFFICE.

ALBERT G. HEINLE, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN GEARINGS.

Specification forming part of Letters Patent No. **214,821**, dated April 29, 1879; application filed October 4, 1878.

To all whom it may concern:

Be it known that I, ALBERT G. HEINLE, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Gearing; and I do hereby 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a front elevation of my invention. Fig. 2 is a front elevation of modification. Fig. 3 is a sectional view of modification.

This invention relates to a novel construction of toothed gearing and arrangement thereof; and consists, primarily, in combining in one system toothed wheels and friction-wheels, acting co-operatively, the friction-wheels being integral with their toothed mates, substantially as hereinafter described and claimed.

My invention also consists in the specific construction, combination, and arrangement of parts, as hereinafter described and claimed.

The drawings illustrate my invention as applied to rolling-mill pinions for a two-high train of rolls.

A designates the housings, and B C the pinions. Both pinions have the usual teeth or cogs *a*, which may be straight, spiral, curved, V-shaped, or otherwise, according to the desire of the maker. Pinion B has at each end the smooth collars *b* and grooves *c*, having inclined sides for friction-surfaces. Pinion C has correspondingly-situated grooves *b'* and collars *c'*, similarly inclined on their sides.

The pitch-line is about the same for the collars as for the cogs, and the latter are so constructed with reference to their respective grooves as to leave room for taking up wear, as shown. Thus the inclined sides of the collars and grooves bear upon each other and afford a gripe which, while very greatly assisting the teeth in their function, prevents the jarring and sudden strain on the teeth which proves so injurious.

Other important advantages are derived from such a construction.

In three-high pinions the intermediate brasses are dispensed with, as the collars and grooves afford the required bearings. Should a tooth break or become so worn as to refuse to bite, the friction-collars force the revolution beyond the defective tooth, and thus prevent spoiling a "pass" frequently. The pinions are not so exposed to the dangers of backlash.

In two-high pinions, should a "wabbler" twist off, the same facilities for inversion exist as with ordinary pinions. To acquire like facilities for three-high gearing it is only necessary to construct the combined tooth and friction pinions with alternating ends, as in Fig. 2. The friction-surfaces are then interchangeable, the middle pinion having at one end a collar, and at the corresponding point on the other end a groove, and the other pinions being made in like manner. If the middle wabbler break or twist off it can be interchanged with the upper or lower pinion, as with the ordinary gearing.

The invention admits of an almost infinite variety of uses. It can be applied to the different styles of gear, such as spur-and-pinion, beveled gear, miter-gear, rack-and-pinion, sun-and-planet, and others, and in all cases effects the same smoothness of motion, freedom from knocking, and complete absence of the irritating rattle and noise incident to toothed gearing of all descriptions. The consequence is, that my form of gear will not wear out as rapidly as those now made, which are subject to the above causes of wear. The teeth are not subject to sudden and injurious strains, and hence are not liable to snap off, and if such an accident should happen I have the friction-surfaces to maintain the motion.

These forms of gear are most conveniently made by casting in one piece both the toothed and friction portions, though they may be made separately and connected.

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

1. A system of two or more toothed gears, each having one or more friction-surfaces engaging with corresponding friction-surfaces on the other or others, each friction-wheel being

integral with its toothed mate, substantially as described.

2. A toothed gear-wheel having one or more friction collars or grooves, all of like pitch, substantially as described, as a new article of manufacture.

3. A rolling-mill pinion having cogs at one portion, and a friction-collar and a friction-groove, both at respectively corresponding points with relation to the cogs, substantially as described, whereby when two or more such pinions are placed together they are interchangeable.

In testimony that I claim the foregoing I have hereunto set my hand this 27th day of September, 1878.

ALBERT G. HEINLE.

Witnesses:

JAMES J. MCTIGHE,

T. J. MCTIGHE.