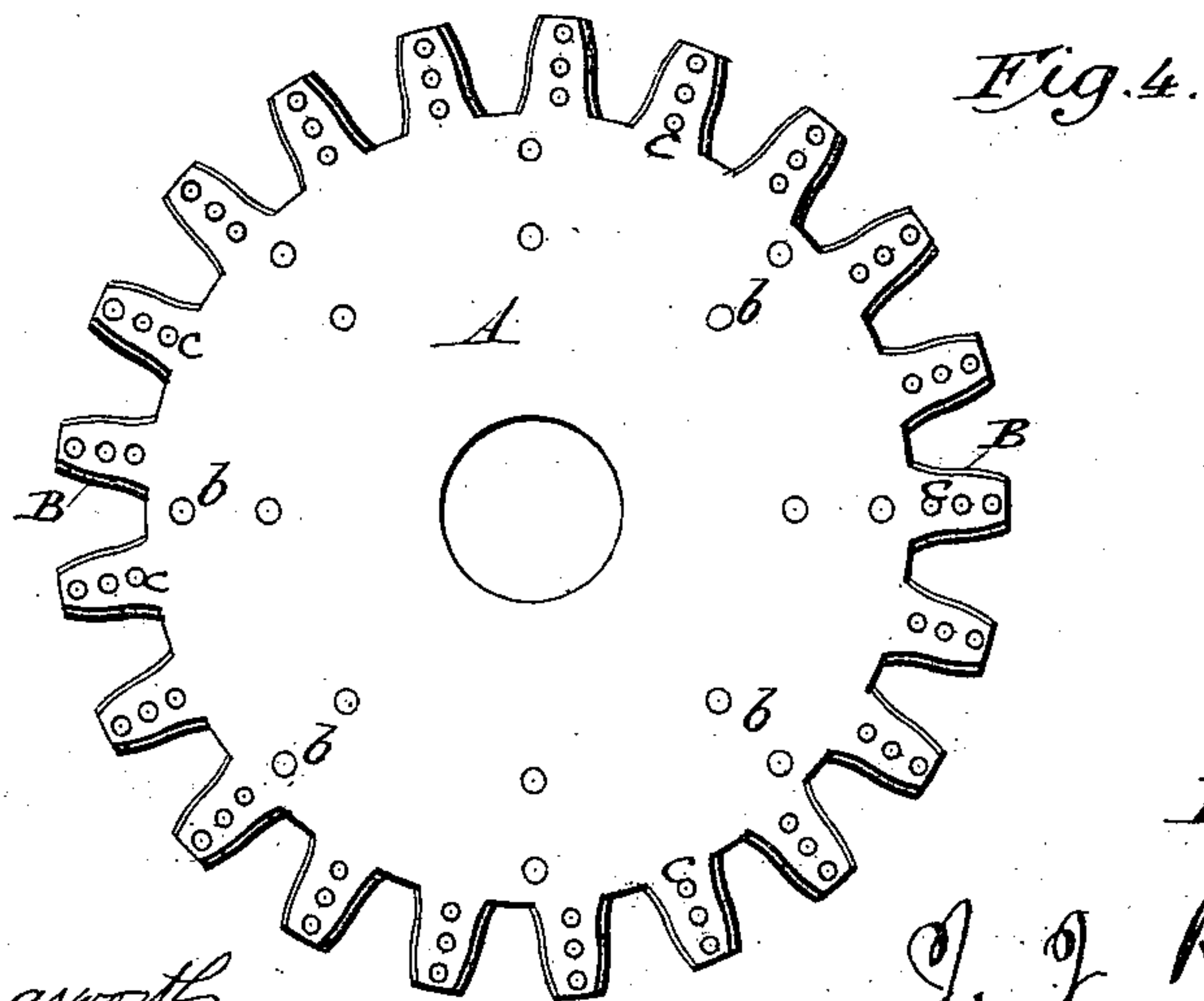
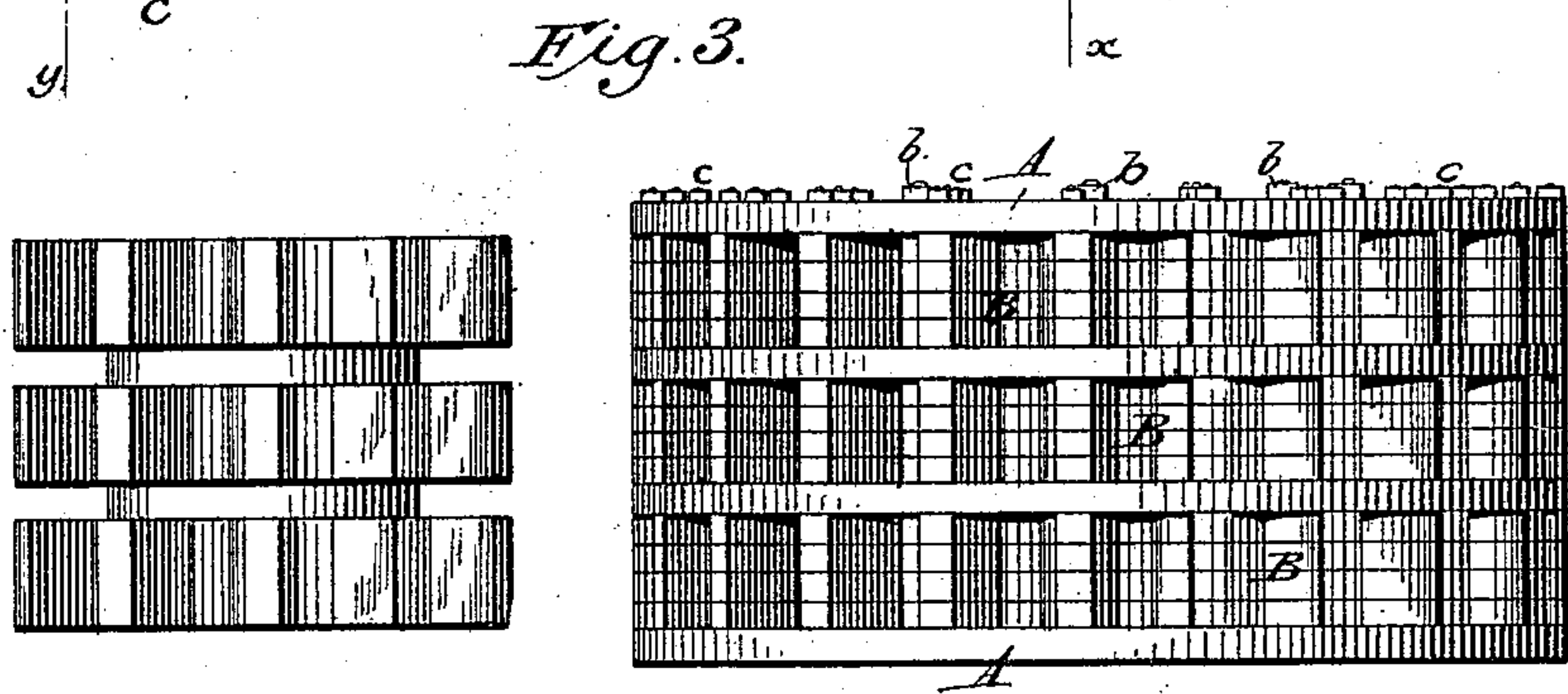
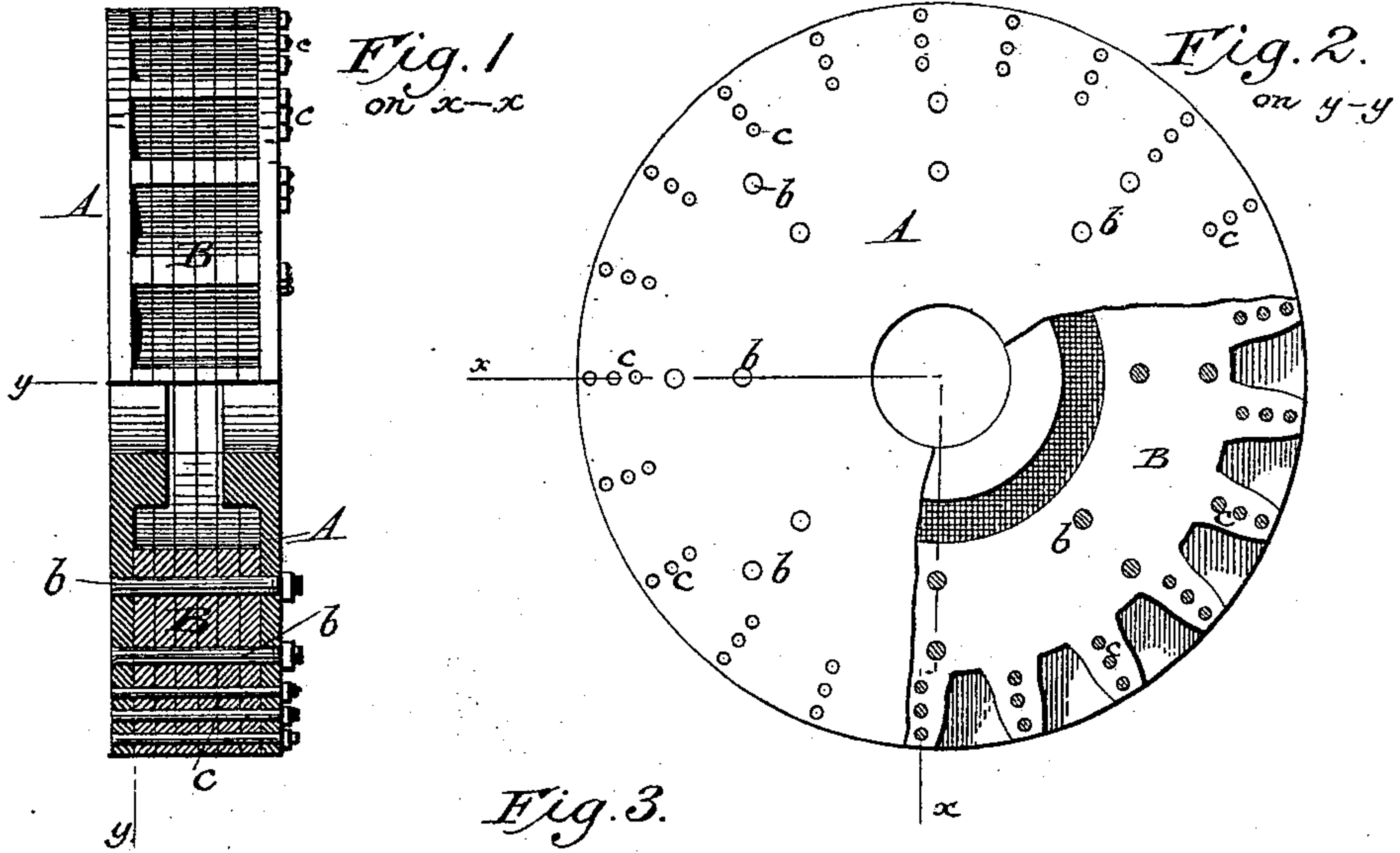


(No Model.)

J. J. RYMAL.  
GEARING.

No. 300,801.

Patented June 24, 1884.



Attest

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# UNITED STATES PATENT OFFICE.

JOHN JEROME RYMAL, OF MILWAUKEE, WISCONSIN.

## GEARING.

SPECIFICATION forming part of Letters Patent No. 300,801, dated June 24, 1884.

Application filed February 26, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN JEROME RYMAL, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain Improvements in Gearing, of which the following is a specification.

The aim of this invention is to provide toothed gearing which will run with less noise and wear and for a greater length of time than that constructed on the ordinary plan.

To this end it consists, essentially, in the combination, with metallic supporting plates or disks, of intermediate layers or sheets of yielding material, preferably leather, the outer edges of which are cut to form gear-teeth and adapted to receive the wear and strain, the construction being such that the metallic portions do not form any part of the wearing-surface. Under my improved construction the metallic plates, which are united by bolts, rivets, or other transverse connections, serve to support, carry, and compress the leather, which serves as a wearing-surface or gear proper, and which, being thus sustained, will run for a great length of time and under heavy strains without appreciable wear or change of form, and without producing the objectionable rumbling or chattering sound which commonly results from the use of other gearing.

The details of the gear constructed on my plan may be modified in various respects without departing from the limits of my invention or changing the mode of action; but it is preferred to retain substantially the construction and arrangement of parts represented in the drawings. In wheels having narrow faces it is sufficient to use two supporting disks or plates—one on each side; but in wheels of greater width it may be necessary to use two or more intermediate plates. Wheels within certain limits of diameter may have the disks or layers of leather each in a single complete piece; but in wheels of large size it will be necessary to construct them of sections or segments of leather placed edge to edge.

Referring to the accompanying drawings, Figure 1 represents an elevation of my wheel, viewed edgewise, one-half of the same being represented in section on the line *x x* of Fig. 2. Fig. 2 represents a side view of the same, a portion of the side plate being broken away

on the line *y y* of Fig. 1. Fig. 3 is an edge view, illustrating the construction which is adapted for wheels having wide faces with intermediate supporting-plates. Fig. 4 is a side view of the wheel in a slightly-modified form, the supporting-plates being toothed or notched at the outer edge instead of being continuous, as in the preceding form.

Referring to the drawings, A represents two outside plates or disks, provided with openings to receive the shaft, arbor, or other support. The central openings are preferably encircled by flanges formed on the plates, as shown in the drawings, to give a wide bearing on the shaft and admit of the plates being keyed or otherwise firmly secured thereon. The plates are of a diameter the same or substantially the same as that of the wheel measured to the extremities of its teeth.

B represents the body portion of the wheel or wheel proper, consisting, as shown, of a number of layers or sheets of leather or equivalent elastic material, placed one upon another side by side and inserted between the metallic plates or sheets or laminae, extending, as shown, in planes at right angles to the axis of the wheel. The leather portion has its periphery cut or otherwise fashioned into spur-teeth of the required form. The two plates are united, as shown, by transverse bolts or rivets *b* and *c*, inserted through the same and also through the intermediate body of leather. These bolts or rivets are applied in such manner as to subject the leather to more compression, in order to give the wearing-surfaces the necessary hardness and stability.

In order to prevent the teeth from yielding under the strain to which they are subjected, certain of the rivets or bolts are passed transversely through the teeth—that is to say, in the direction of the axis of the wheel. The number of rivets or bolts passed through each tooth may be varied according to the shape and size of the layer, the character of the work to be done, and the other controlling circumstances in each case. The co-operating gear or pinion must be made of such width that its teeth may enter between the side plates of my gear in order to engage the leather teeth.

The wheel represented in Fig. 3 is identical



with that represented in the preceding figures, except that it has in addition to the exterior plate the intermediate plates of corresponding form. These intermediate plates assist in giving support to the leather and in maintaining the teeth and pawls in proper position, so that they may not be forced out of place by the strains encountered in practice. The gear or pinion to co-operate with this wheel must be provided with circumferential grooves or notches to receive the intermediate supporting-plates of my gear, as indicated in the drawings.

While it is preferred to employ in ordinary cases supporting plates or disks which have a continuous or unbroken periphery extending to or beyond the ends of the teeth, there are cases in which the disks may be notched or toothed to correspond with the teeth of the body portion, as represented in Fig. 4. When the toothed disks are employed, their teeth are made usually of a size slightly less than those of the body, in order that the entire wear and strain may be thrown on the latter.

The wheels are constructed, as in Fig. 3, with intermediate supporting-plates. These plates may be toothed, to avoid the necessity of grooving the companion gear or wheel.

The intermediate sheets forming the body of the wheel may be composed of paper or equivalent material possessing a moderate degree of elasticity; but it is preferred to use leather, because of its ability to withstand wear better than any other material at present known to me, and because, also, of the fact that the wearing-surfaces will receive a high polish and run with a slight degree of friction.

In order to reduce the expense and weight, the body portion is ordinarily constructed with a central opening of a size greater than those in the side plates; but this is not a necessary feature.

I am aware that gear-wheels have been constructed of alternate sheets of leather and metal, riveted or otherwise secured firmly together, with gear-teeth cut in the outer edges. The object in view was simply that of lessening the noise, and the structure was such that the metallic portions were employed equally with the leather to receive the wear and strain.

It is to be noted as a distinguishing feature of my gearing that the wearing-surfaces are composed wholly of leather or equivalent material, and the metallic portions are employed simply to give support thereto.

Having thus described my invention, what I claim is—

1. In a gear-wheel, the combination, with metallic supporting and confining plates, of an intermediate body of leather or equivalent material having teeth formed therein and adapted to receive the entire wear and strain.

2. In a gear-wheel, the combination of an elastic toothed body portion, consisting of sheets of leather or equivalent material, external metallic plates with corresponding teeth of a size less than the others, and fastening devices connecting the plates and passing through the intermediate body.

3. In a gear-wheel, a laminated body of leather or equivalent material having peripheral teeth formed thereon, and external metallic plates provided with teeth of a size slightly less than the teeth of the body portion, whereby the metallic portions are relieved from wear but caused to support the elastic teeth.

4. In a gear-wheel, the combination, with external plates with peripheral teeth, of an intermediate laminated body of elastic material, also provided with teeth, and transverse bolts or fastening devices passing through the teeth of the body and of the external plates, as described and shown.

5. A gear-wheel consisting of toothed side plates provided with central openings to receive the shaft or arbor, and an intermediate toothed body of elastic material having a central opening of greater diameter than those of the plates.

6. In a gear-wheel having a body portion composed of leather with spur-teeth formed thereon, metallic side plates, and transverse bolts or rivets passed through the said plates and through the teeth of the body portion.

JOHN JEROME RYMAL.

Witnesses:

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