2 Sheets—Sheet 1.

N. C. LOMBARD.

Car Wheel.

No. 95,122.

Patented Sept. 21, 1869.

Fig. 1

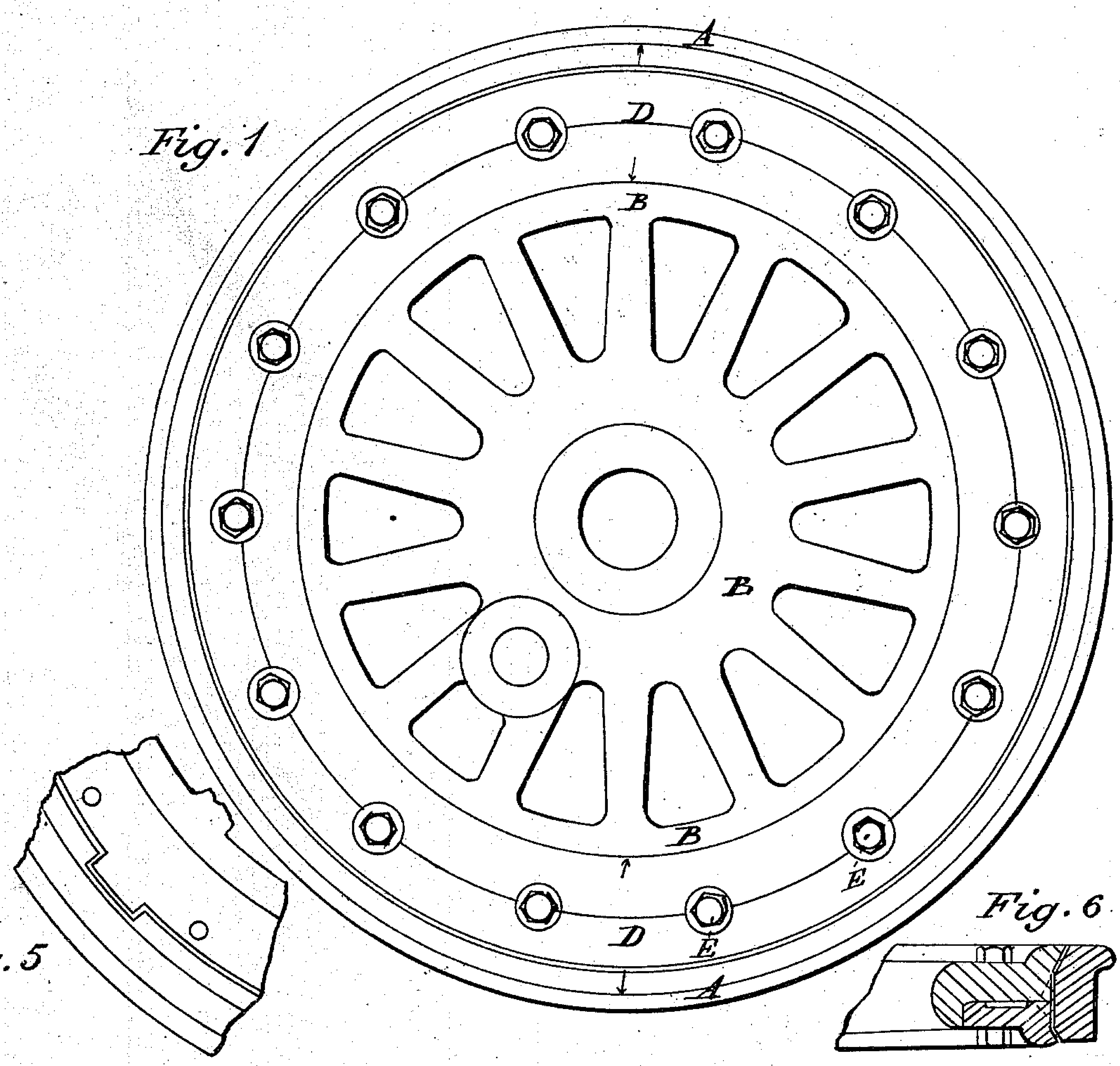

Fig. 5

Fig. 6

Fig. 4

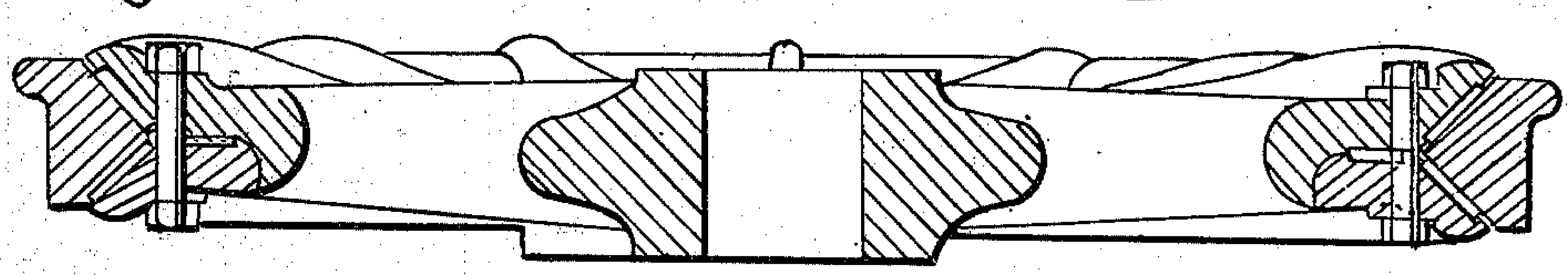

Fig. 3

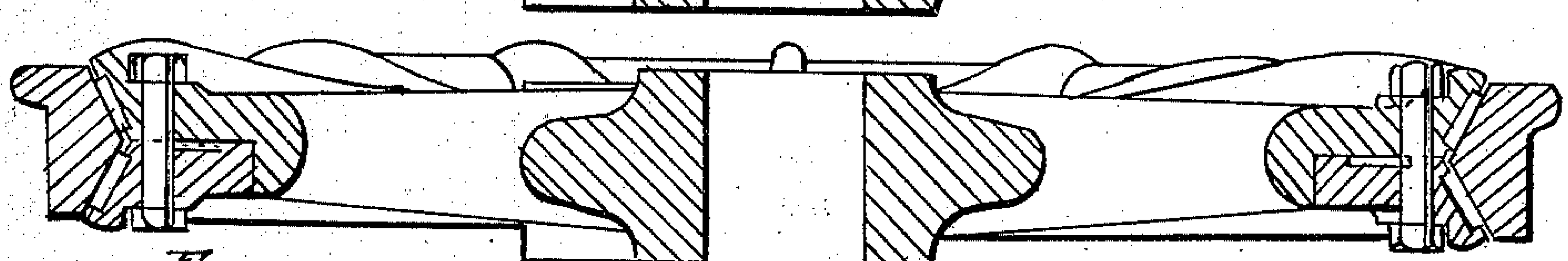

Fig. 2

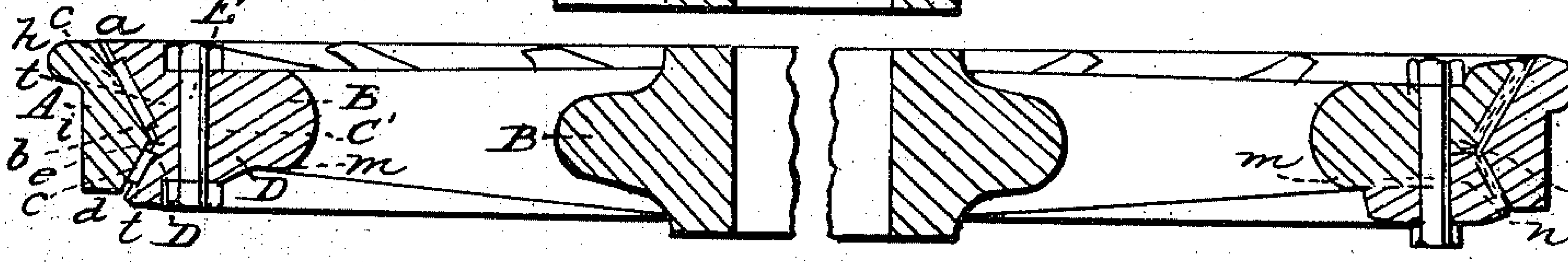

Fig. 2'

Witnesses:

Carroll D. Wright

Austin S. Howarth,

Inventor:

Nathan C. Lombard

2 Sheets—Sheet 2.

N. C. LOMBARD.

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Fig. 7

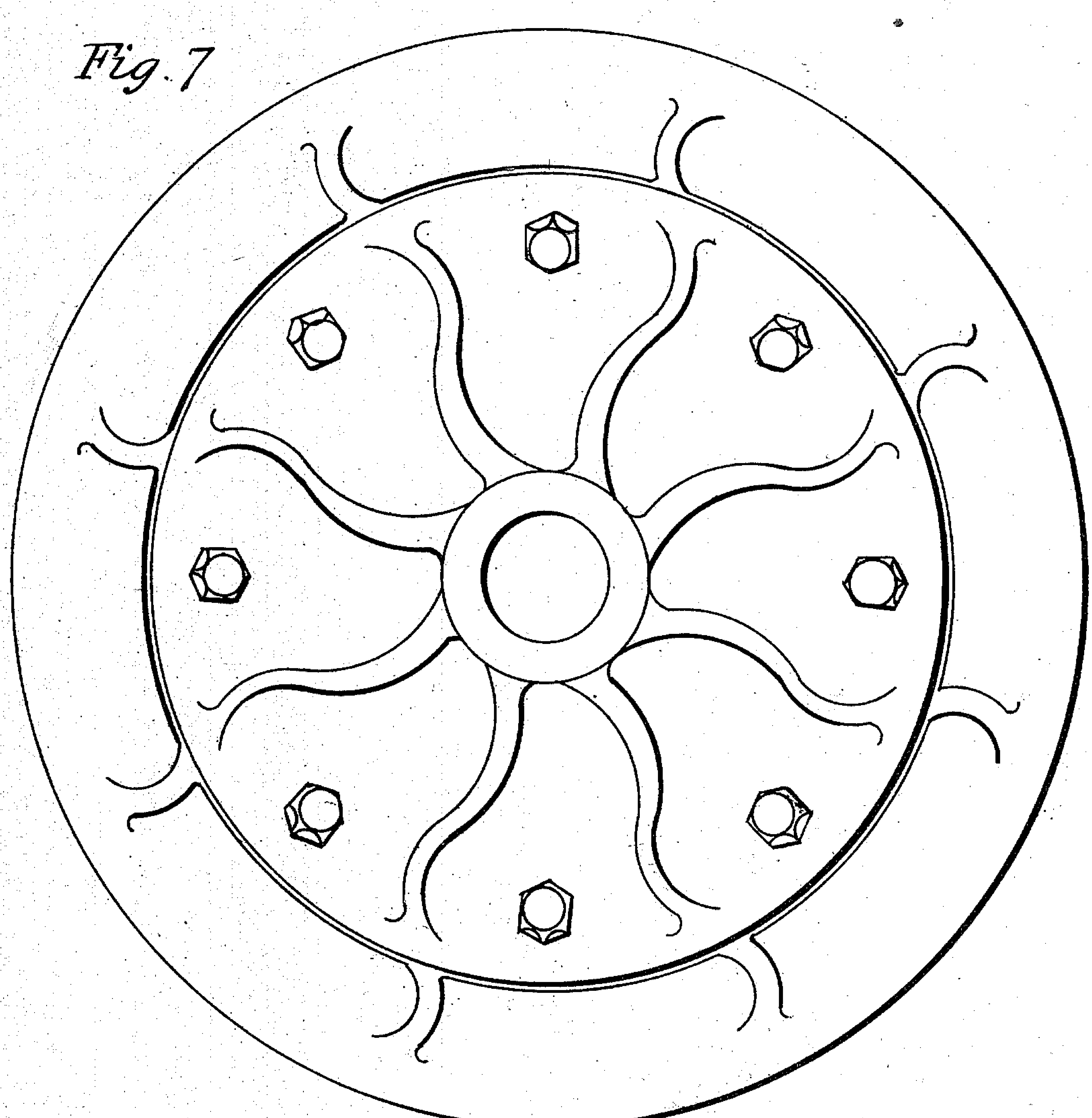
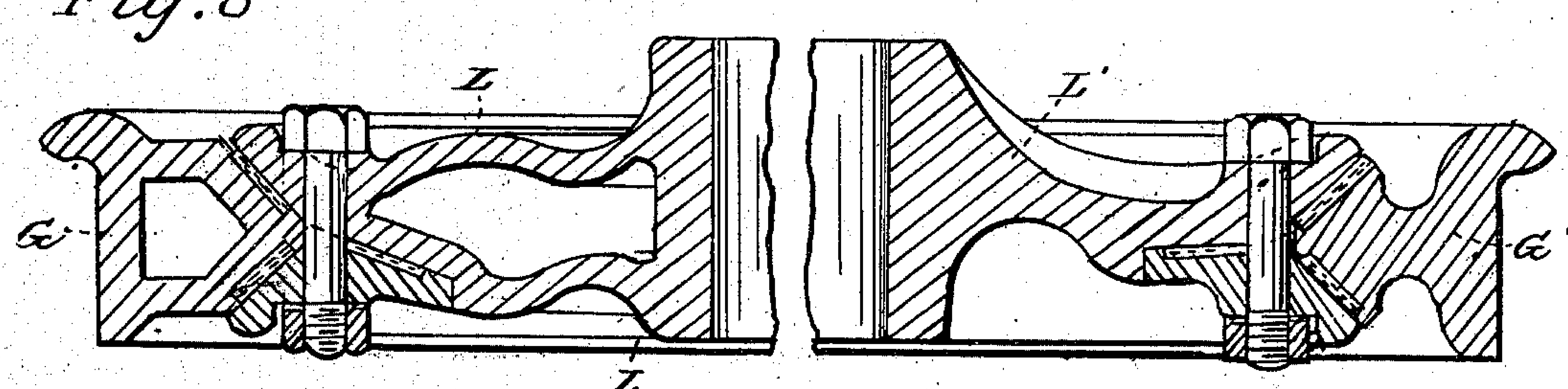


Fig. 8



Witnesses:

Carroll D. Wright

Austin S. Howarth.

Inventor:

Nathan C. Lombard

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

United States Patent Office.

NATHAN C. LOMBARD, OF CAMBRIDGE, ASSIGNOR TO JAMES A. WOODBURY, OF WINCHESTER, MASSACHUSETTS.

Letters Patent No. 95,122, *dated September* 21, 1869.

IMPROVED RAILWAY-CAR AND DRIVING WHEEL.

The Schedule referred to in these Letters Patent and making part of the same.

To whom it may concern:

Be it known that I, NATHAN C. LOMBARD, of Cambridge, county of Middlesex, and State of Massachusetts, have invented an Improved Elastic Car and Driving-Wheel; and that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved elastic driving-wheel.

Figures 2 and 2′ show cross-sections of same.

Figures 3, 4, and 6 are modifications of same.

Figure 5 is a vertical transverse section of the rim and body of my improved wheel, showing lugs to prevent turning of binding-ring.

Figure 7 is a side elevation of a car-truck wheel embodying my improvements.

Figure 8 shows cross-sections of car-truck wheel embodying my improvements. This figure shows two methods of adapting my improvements to car-truck.

The object of my invention is to produce an elastic car or driving-wheel which shall be simple in construction, as well as strong and durable.

The result sought in all inventions of this class is to produce a wheel which shall be capable of bearing the immense strain to which car and driving-wheels are subjected; but, as yet, no wheel has been produced possessing the requisite integrity of construction. Complexity defeats the purpose in some, while in others the metal and cushions are not well adapted to bear weight and strains; and, again, the parts fail to present the proper dimensions, some being light, when the reverse should exist, so that, although material enough may be employed, yet its want of mechanical distribution causes the invention to be considered useless.

I am aware that a wheel has been shown and described composed of a rim having inner corrugations and corresponding seat in the binding-ring and body of the wheel, the corrugated rim having a double bevel, and the corrugated faces of the binding-ring and wheel being likewise bevelled. This corrugated form makes necessary the use of cast-metal, and is otherwise impracticable. I form my tire with a smooth inner surface, of regular curve, and corresponding seat in the binding-ring and body of the wheel, and without any interposed rim between the tire and the wheel. I am thus able to use wrought-metal, which is the only practicable material for the tires of railway-wheels.

I have striven to avoid these objections, by the employment of but few pieces, and the accurate distribution and adaptation of materials, and putting the various parts together on established principles in mechanics.

The nature of my invention consists—

First, in the combination of a double bevelled tire with a bevel-face wheel and binding-ring, as will be explained.

Second, in the combination of a double bevelled tire with a wheel-body and a binding-ring, which are recessed, for a purpose hereafter mentioned.

Third, the combination of an inner double bevelled flanged tire with a bevel-faced fastening or binding-ring, and with the body of the wheel, when the tread-portion of said tire is over or around said binding-ring, and the flanged portion over or around the solid portion or body of the wheel, the object being to bring the greatest point of strain on or over the point or part of greatest capacity for resistance.

In the drawings, sheet 1—

A is the rim or tire of a driving-wheel.

B, the body of the wheel.

D, a binding-ring, fitting into annular space *b m* in the side of the body of wheel next to the rim.

E E are bolts.

c c c′ are elastic cushions.

The peripheric surfaces of the body of the wheel and binding-rim are oblique; but, when together, the surfaces of each are inclined opposite to each other, forming an obtuse angle, *a b d*, but with the face *a b* much longer than face *b d*, the face *b d* being that of the ring D. Now, the inner surface of the rim A presents a counter-angle, fitting the angle *a b d*, formed by the body of the wheel B and ring D. The angle *b* is nearer the opposite side of the wheel from the flange *h* of the tire. The object of this will be explained below.

c c are elastic cushions between the rim A and the body B and the ring D, while *c′* is a cushion between the ring D and the body B. The object of this cushion *c′* is to preserve the close fit of ring D and the body B, so that the bolts will not work loose. The office of cushions *c c* is to give an elasticity to the entire wheel equally felt; and the prime object of my invention—the object of having the angle *b* to one side of the centre of the rim, and nearer the opposite side from the flange *h*—is, that as the rim bears upon the rail at a point near the flange, the greatest pressure, of course, is at this point. Now, by the construction shown, the rim is capable of sustaining this pressure, without the inner surface being made concave, by "peening"-action upon the outer surface of rim. Again, by this position of angles, the rim does not act so much as a wedge upon the body of the wheel and the ring as it otherwise would. For instance, as in construction shown in fig. 4, as will be seen, a greater thickness of rim is obtained at *b i* than at other points; and this construction, with the described position of the angle, prevents the "peening" spoken of above. This is important, and prolongs the wear of a wheel-rim.

Another very important object attained by placing the binding-ring D on that side of the wheel opposite or most remote from the side where the flange is, consists in this, that the most excessive strain upon the wheel comes in the angle or corner between the tread and flange of the wheel or rim, which point or part has both vertical and lateral strains, blows, or jars to resist. As this part of the rim is placed over or around the solid portion of the body of the wheel, of course that solid portion is more able to resist or withstand this double strain.

The portion of the tread of the rim that is over or around the binding-ring D, of course, transmits its strains, in whole or in part, upon said ring and its bolts, and the ring and bolts can sustain that portion of the strain; but, if the flange-portion of the rim were placed over or around the binding-ring, it could not sustain the double strains that come in the corner formed by the union of the tread with the flange.

In fig. 2, the space *m*, in the body of the wheel, for the reception of the binding-ring, is curved at *m*; but, in fig. 2′, the space has right angle *m n o*, with corresponding form of ring, to fit the same.

The cushions *c c*, fig. 2, are held in a recess in the face of the body of the wheel, and the face of the ring D. These spaces *e e′* and *t t′* prevent the cushions from slipping, and also protect them from the action of oil, or other substances which might otherwise injure them. The cushion *c′* is, by its position, thoroughly protected, but it is also held fast by the shoulders of the recess in which it is held.

The construction and relative bearing and arrangement of the rim, body of wheel, and binding-ring, with cushions, are varied and modified in figs. 3, 4, and 6, but the same general principles and equivalent forms apply and prevail throughout. The result is a firm, compactly-built wheel, with the parts securely held together, and capable of sustaining the strain which a driving-wheel is required to meet.

In figs. 7 and 8, sheet 3, my improvements are applied to car-truck wheels. The same general features are preserved. Two forms or constructions of rims are shown, the rim G being of iron, and hollow, and the body L hollow, while G′ is solid, and the body L′ the same.

In building wheels after my invention, it may be requisite to use check-nuts upon the bolts E; or rivets may be employed.

It will be seen, from the description given, that while I produce a wheel capable of the endurance of the ordinary wheels in use, I secure the elasticity so desirable, the beneficial results of which are too well known to need elaboration, and yet avoid a complex, and consequently weak structure, so dangerous that corporations refuse to grant a trial; and, although cost is not particularly an object in producing a serviceable elastic wheel, I claim to have succeeded in bringing out one at a moderate expense.

Having thus fully described my invention,

What I claim as new therein, and desire to secure by Letters Patent, is—

1. The combination of a double bevelled tire with a bevel-faced wheel and binding-ring, substantially as described.

2. The combination of a double bevelled tire with a wheel-body and a binding-ring, which are recessed, as and for the purpose described.

3. The combination of an inner double bevelled flanged tire with a bevel-faced fastening or binding-ring, and with the body of the wheel, when the tread-portion of said tire is over or around said binding-ring, and the flanged portion over or around the solid portion of the body of the wheel, substantially as described, and for the purpose set forth.

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

NATHAN C. LOMBARD.

Witnesses:

CARROLL D. WRIGHT,

AUSTIN S. HOWARTH.