No. 862,214. PATENTED AUG. 6, 1907.

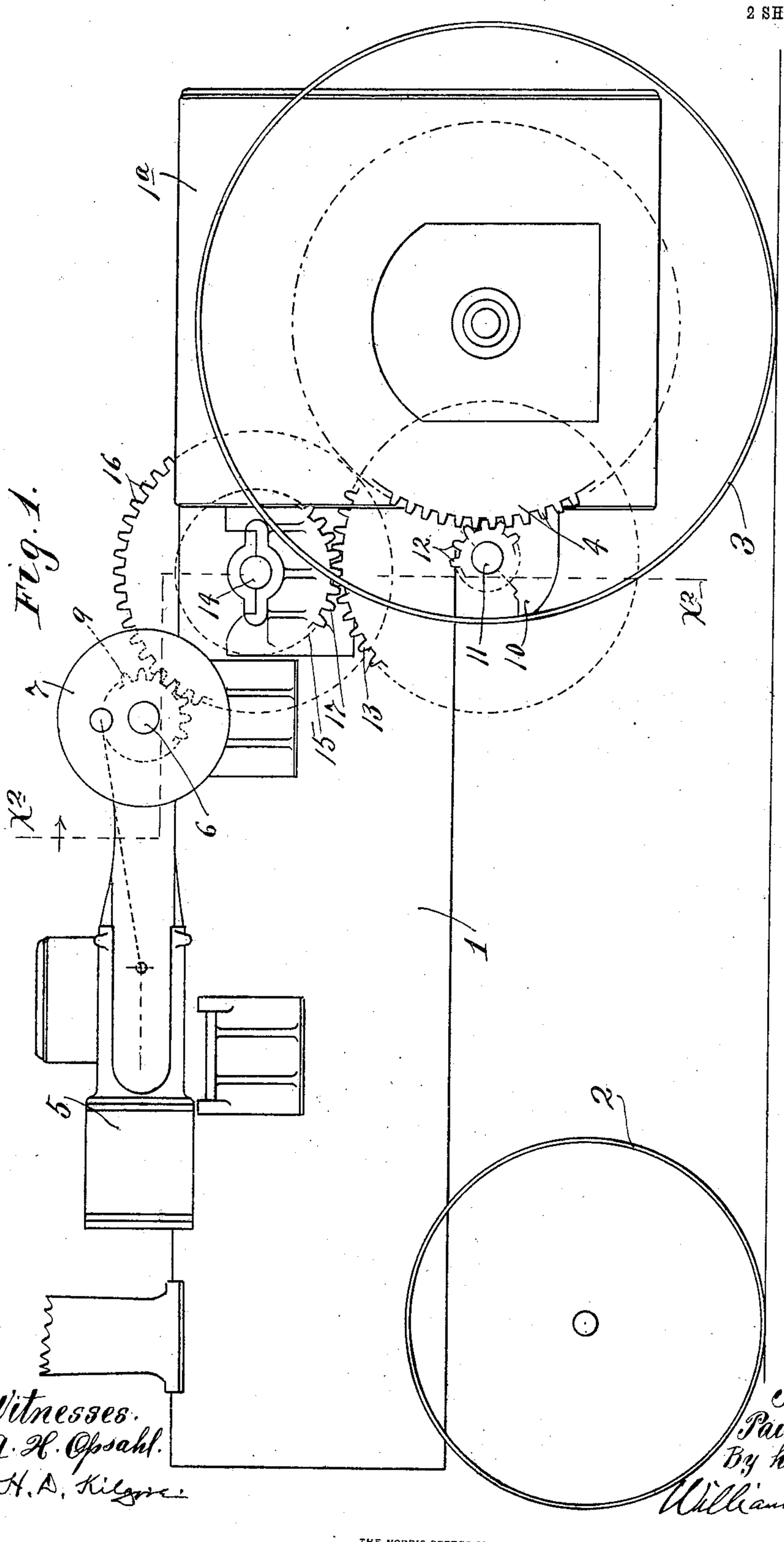
# P. SWENSON.

## TRACTION ENGINE.

APPLICATION FILED OCT. 12, 1906.

2 SHEETS—SHEET 1.

Fig. 1.




Witnesses.
A. H. Opsahl.
H. A. Kilgore.

Inventor
Paul Swenson
By his Attorneys
Williamson & Merchant

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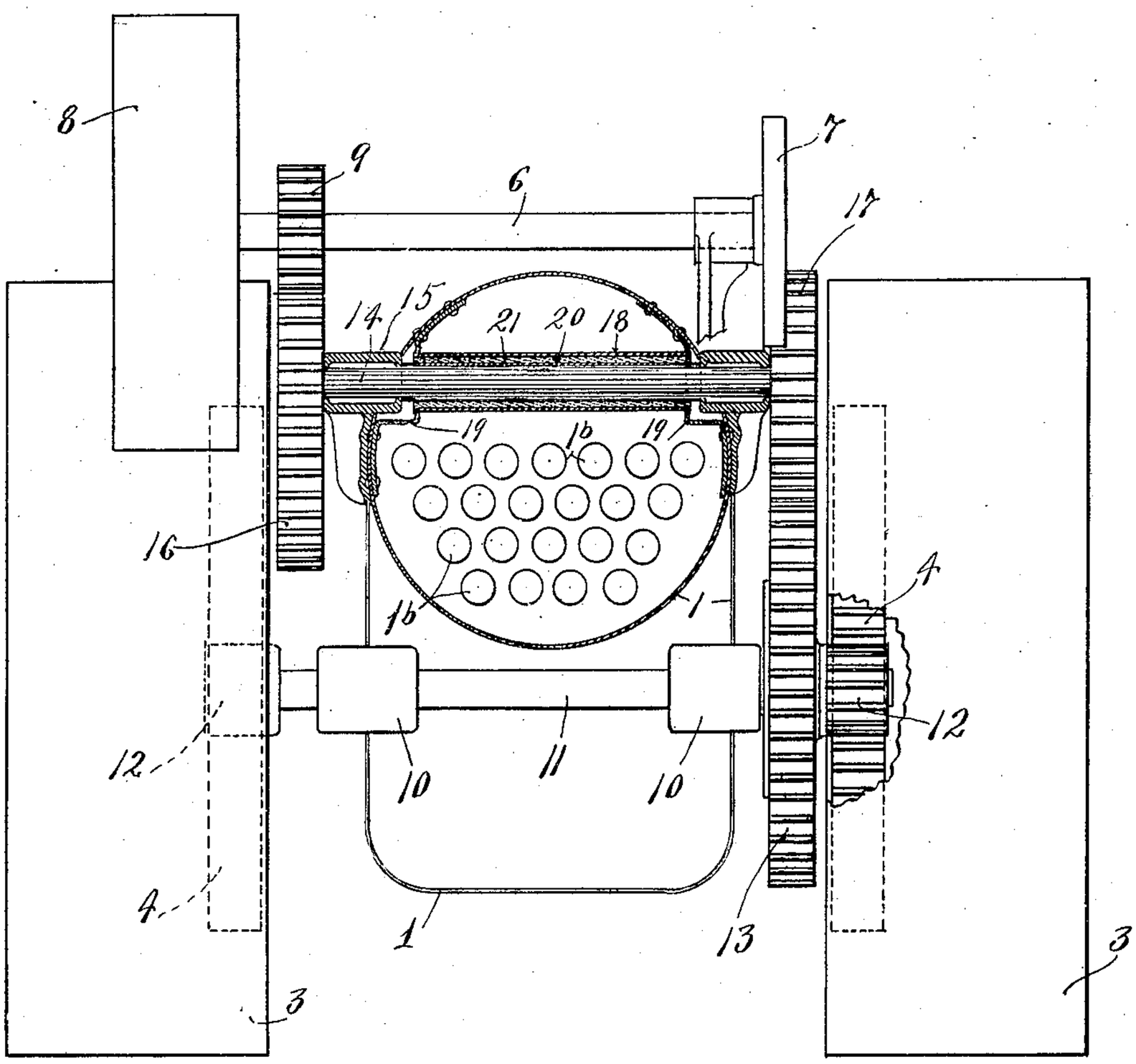
2 SHEETS—SHEET 2.

Fig. 2.

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A. C. Opsahl.
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Inventor.
Paul Swenson.
By his Attorneys
Williamson Mitchell

# UNITED STATES PATENT OFFICE.

PAUL SWENSON, OF HOPKINS, MINNESOTA.

## TRACTION-ENGINE.

No. 862,214. Specification of Letters Patent. Patented Aug. 6, 1907.

Application filed October 12, 1906. Serial No. 338,590.

*To all whom it may concern:*

Be it known that I, PAUL SWENSON, a citizen of the United States, residing at Hopkins, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Traction-Engines; 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 appertains to make and use the same.

My invention relates to traction engines, and has for its object to provide an improved driving gear or power transmission mechanism therefor.

The invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate my invention, like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a diagram view in side elevation of a traction engine having my improved driving gear applied thereto, and Fig. 2 is a view partly in elevation and partly in section, on the irregular line $x^2\ x^2$ of Fig. 1, some parts being broken away.

Of the parts of the traction engine, the numeral 1 indicates the boiler, the numeral 2 the front wheels, and the numeral 3 the rear or traction wheels, which traction wheels, as is usual, are provided with large spur gears 4.

The numeral 5 indicates diagrammatically the horizontal engine which is rigidly secured on top of the horizontal portion of the boiler 1 in the usual way, and which engine includes the usual engine driven gear shaft 6, having at one end a crank disk 7, and at its other end a large driving pulley 8. On the crank shaft 6, at the opposite side of the boiler to the crank disk 7, is secured a spur pinion 9. Mounted in suitable bearings 10, suitably secured to the boiler below the horizontal portion thereof and adjacent to the fire box end $1^a$ thereof, is a transversely extended shaft 11, which, at its ends, carries spur pinions 12, that mesh one with each of the gears 4 of the two traction wheels 3. Secured to the shaft 11, on the same side as the crank disk 7, is a large spur gear 13.

In accordance with my invention, the driving connections between the pinion 9 and gear 13 include a shaft that is extended through the horizontal portion of the boiler. This shaft 14 is mounted in suitable bearings 15, secured on the sides of the boiler. One end of said shaft 14 is provided with a spur gear 16 that meshes with the pinion 9, and at its other end is provided with a large spur pinion 17 that meshes with a large gear 13 of the shaft 11.

The shaft 14 extends through a large tube 18, which tube extends transversely and horizontally through the horizontal section of the boiler above the flues $1^b$ thereof. To form suitable seats for the ends of the tube 18, the adjacent side portions of the boiler are shown as provided with inset plates as shown at 19. To insulate the shaft 14 from the heat of the boiler, the tube 18 is provided with a lining 20 of asbestos, which lining is conveniently held in position by a light metal tube 21.

Hitherto it has been customary to transmit power from the engine to the traction wheels by driving gears located on one side of the boiler, and in practice it has been found that with this arrangement, the strain transmitted through the gears reacts on one side of the boiler, and has a tendency to bend or spring the boiler out of shape. Furthermore, very large intermediate gears have usually been employed, and the arrangement has been such that a variation in the driving speed of the traction wheels, with respect to the crank shaft of the engine, could not be readily made by a substitution of gears. By the improved arrangement above described, wherein part of the driving gears are at one side of the boiler and part thereof at the other, and the power is transmitted by a shaft that is extended through the boiler, the boiler is relieved from torsional and lateral strains such as would tend to spring the same out of shape. Furthermore, by passing the said power transmission shaft through the horizontal portion of the boiler, the reacting forces transmitted to the boiler from the said shaft are carried below the top thereof, and are received by large and heavy bearings firmly anchored to the opposite sides thereof. Again, by this improved arrangement, speed and power transmitted from the engine driven crank shaft to the traction wheels may be varied to suit different conditions, by the substitution of coöperating pairs of pinions 9 and gears 16 on the respective shafts 6 and 14.

The driving gear or power transmission mechanism described has been put into actual use on a traction engine, and has been highly efficient for the purposes had in view.

What I claim is:

In a traction engine, the combination with traction wheels 3 and gears 4 carried thereby, of a steam engine mounted on the horizontal portion of its boiler and includ-

ing an engine driven crank shaft 6, a tube 18 extended transversely through the horizontal portion of said boiler above the flues thereof, bearings 15 secured to the sides of the boiler in line with said tube 18, the shaft 14 journaled in said bearings 15 and extended through said tube 18, the shaft 11 journaled in suitable bearings in the boiler and provided at its ends with pinions 12 meshing with said gears 4, a gear 16 on one end of said shaft 14 and a pinion 17 on the other end thereof, a pinion 9 on said shaft 6 meshing with said gear 16, and a gear 13 on said shaft 11 meshing with said pinion 17, substantially as described.

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

PAUL SWENSON.

Witnesses:
E. F. CODDINGTON,
J. A. HASP.