H. G. BROOKS.

COMPOUND SHAFTS FOR ENGINES.

No. 182,159. Patented Sept. 12, 1876.

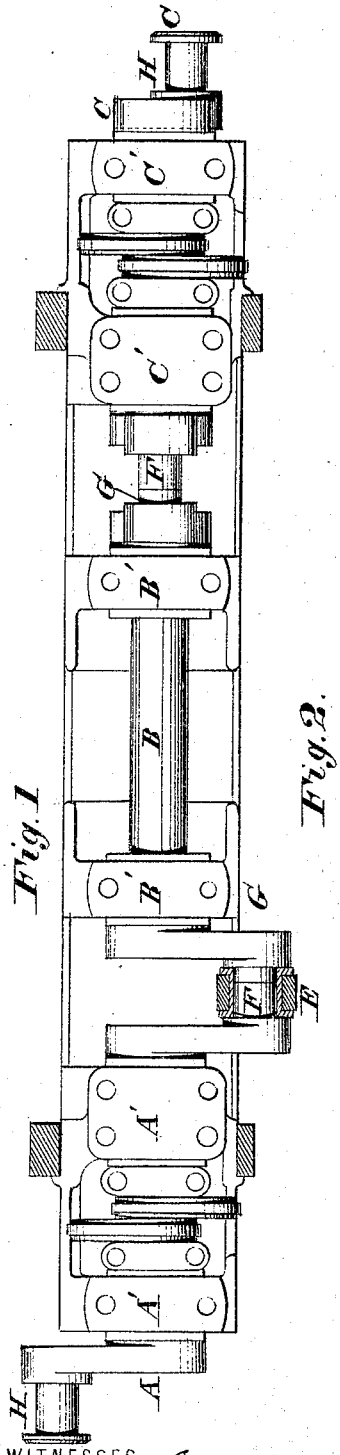

Fig. 1

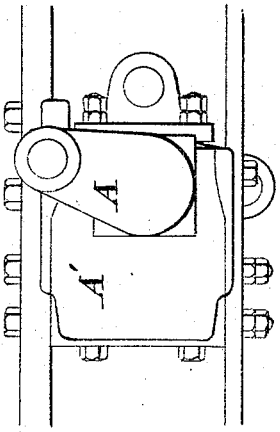

Fig. 2.

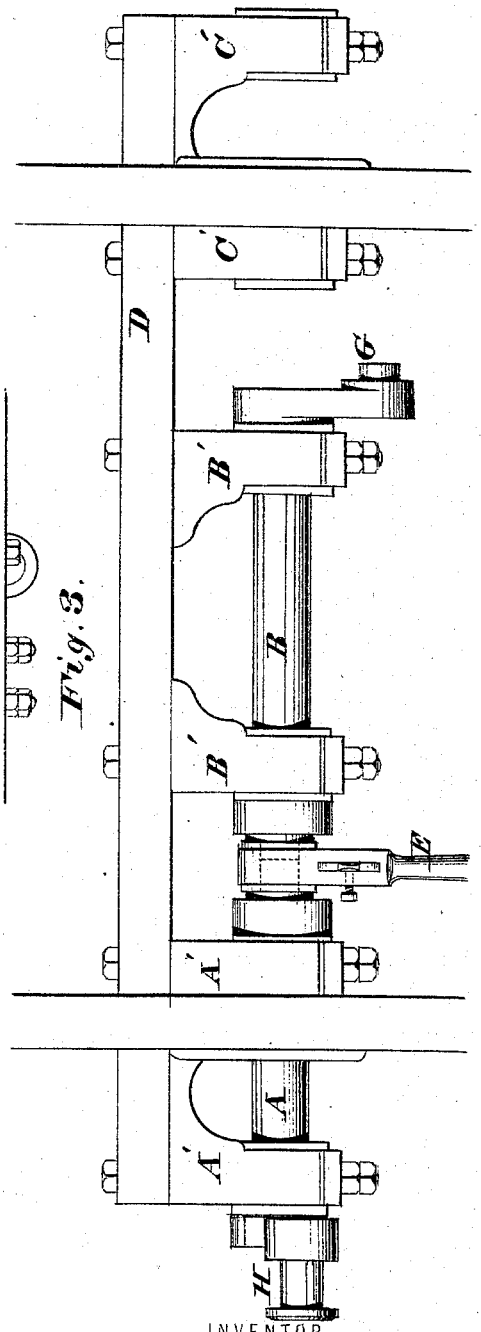

Fig. 3.

WITNESSES

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HORATIO G. BROOKS, OF DUNKIRK, NEW YORK.

IMPROVEMENT IN COMPOUND SHAFTS FOR ENGINES.

Specification forming part of Letters Patent No. **182,159**, dated September 12, 1876; application filed May 26, 1876.

To all whom it may concern:

Be it known that I, HORATIO G. BROOKS, of Dunkirk, in the county of Chautauqua and State of New York, have invented certain new and useful Improvements in Compound Shafts for Engines, of which the following is a specification:

This invention belongs to that class of steam-engines in which motion is communicated from the steam-cylinder to the driving-wheels through an intermediate crank-shaft, and is intended to obviate the difficulties arising from the use of a full crank-shaft, which rapidly deteriorates, and, consequently, is liable to cause frequent and troublesome delays from breakage, as it has to be made small for use in a light engine.

The invention consists in transmitting the motion from the cylinder to the driving-wheel by a compound shaft, composed of three crank-shafts, having independent crank-pins and separate bearings.

In the accompanying drawing, Figure 1 is a side elevation of my improved device. Fig. 2 is an end view of the same; and Fig. 3 is a plan view, with one of the crank-shafts removed.

A B C may represent the three crank-shafts, turning in their bearings A′ B′ C′, which are secured to a cross-beam, D.

E is a pitman, connecting the steam-cylinders and the crank-shaft. Two of said pitmen are used in practice, although but one is shown here.

F G are pins on the crank-shafts, to form bearings for the pitmen. The pins F on the shafts A C are longer than those on the shaft B, as they are the working shafts, and upon them comes the reactionary strain, the crank-shaft B steadying the others, and acting as a fly-wheel to overcome dead-centers.

In the drawing the ends of the crank-pins are shown to abut to form a bearing for the pitmen; but there may be, if desired, a space between them, and the end of the pitmen be forked or split, to reach from one to the other.

The connecting-rods of the driving-wheels are attached to the wrists H on the crank-shafts A C.

By the use of the crank-shafts A C to communicate motion to the driving-wheels and withstand reactionary motion, and the central shaft to overcome dead-centers, a much more durable means is obtained than by a full crank-shaft, which would have to both overcome dead-centers and stand the great strain, and would thus be more liable to deterioration and consequent breakage, as this office of turning the crank-shafts over their dead-centers is received as a reactionary or torsional strain in or within a full shaft (in addition to a driving strain) four times during every full revolution of the wheels, and it would have to be made much larger and heavier than it is practicable to work on a light engine, such as is used for rapid transit on an elevated railway.

If it is desired, the middle crank-shaft may be dispensed with by forging the outer arms H of the crank-shafts A C quartering or at right angles to the inner arms or pins F of said cranks, although it would not give so good a motion as when the middle shaft B is used.

The pins F on the crank-shafts A C may be extended, and pass into, with an easy-slipping fit, the bosses or hubs or arms of the shaft B.

I am aware that an intermediate crank-shaft has heretofore been used, in which the cranks are arranged at such an angle as to push one another over dead-centers. This, therefore, I do not claim; but

What I do claim, and desire to secure by Letters Patent, is—

1. The combination of the shafts A C to transmit motion to the driving-wheels, and the shaft B to overcome dead-centers, all having separate bearings and disconnected pins, as set forth.

2. The combination of the pitmen E, disconnected crank-pins F G, crank-shafts A B C, and wrists H, for transmitting motion from the steam-cylinder to the driving-wheels, as specified.

HORATIO G. BROOKS.

Witnesses:
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