(No Model.)

# W. A. PITT.

## STEAM ENGINE.

No. 471,804. Patented Mar. 29, 1892.

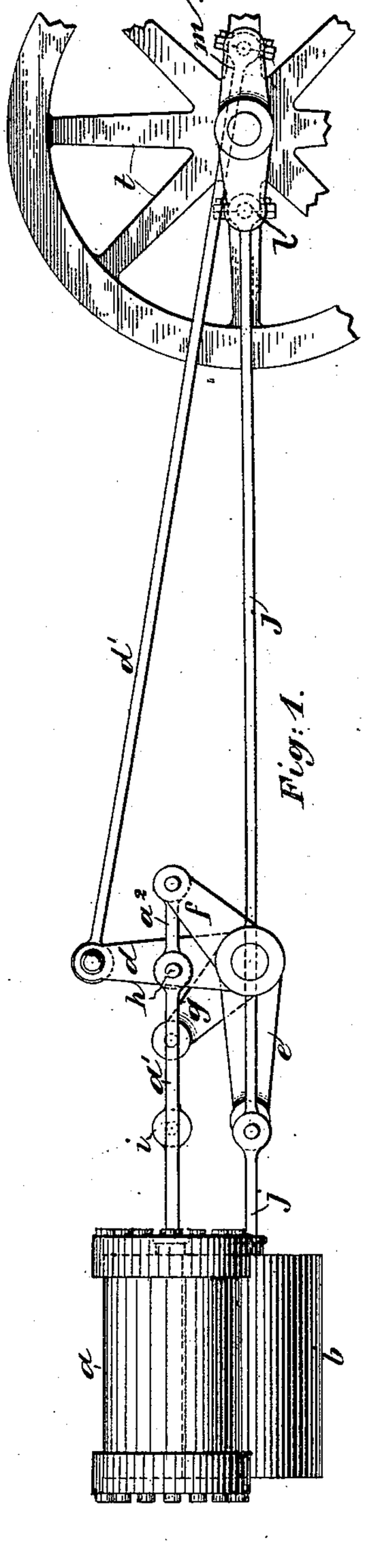


Fig. 1.

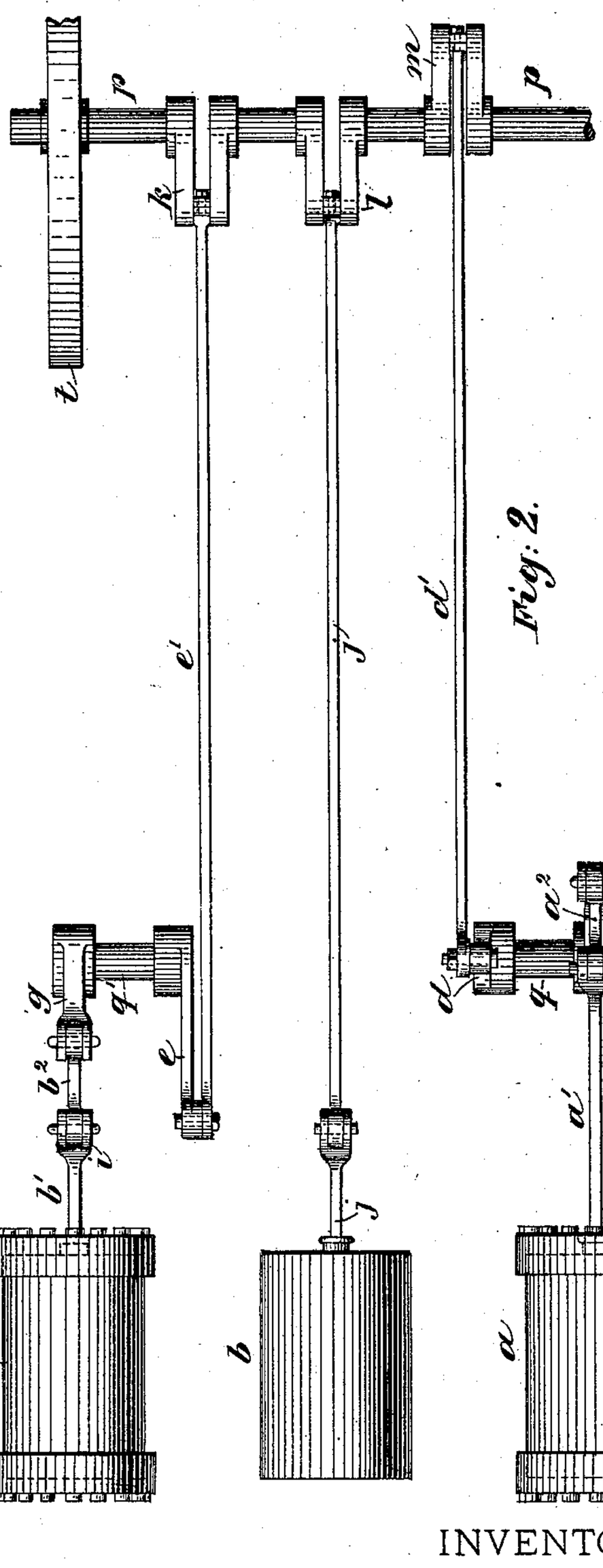


Fig. 2.

WITNESSES:
Herbert Blossom.
Charles A. Barker

INVENTOR:
William A. Pitt
By K. Newell
Attorney

# UNITED STATES PATENT OFFICE.

WILLIAM A. PITT, OF STAMFORD, CONNECTICUT.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 471,804, dated March 29, 1892.

Application filed August 24, 1889. Serial No. 321,878. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM A. PITT, a citizen of the United States, residing at Stamford, in the county of Fairfield and State of Connecticut, have invented certain Improvements in Steam-Engines, of which the following is a specification.

My invention relates to improvements in reciprocating-piston engines employed for imparting rotary motion to shafts; and the object of the invention is to provide an intermediate mechanism between the piston of the engine and the shaft to be rotated, whereby I am enabled to obtain the same uniformity of movement of the piston throughout its stroke as may be attained in a direct-acting engine.

The invention will be fully described hereafter, and its novel features carefully defined in the claims.

In the accompanying drawings, which serve to illustrate one embodiment of my invention, Figure 1 is a side elevation of an engine embodying my improvements, and Fig. 2 is a plan of the same.

The drawings show two engines coupled indirectly or through independent intermediate rocker mechanisms each to a crank on the power-shaft to be rotated, said cranks being oppositely set on the said shaft.

Let *p* represent the power crank-shaft, *t* a fly-wheel thereon, and *k* and *m* cranks on the said shaft.

*a* and *c* are the engine-cylinders, and *a'* and *b'* the respective piston-rods of the same. The cylinders *a* and *c* are set abreast, and they are so situated with reference to the power-shaft that a plane passing through their axes will bisect a plane perpendicular thereto and passing through the axis of the power-shaft at a distance from the latter equal to the length of the cranks *k* and *m*.

The piston-rods *a'* and *b'* are coupled, respectively, by connecting-rods $a^2$ and $b^2$ with the respective arms *f* and *g* on intermediate rock-shafts *q* and *q'*. On the said rock-shafts are also fixed, respectively, the longer arms *d* and *e*. The arm *d* is coupled by a connecting-rod *d'* to the crank *m* of shaft *p* and the arm *e* by the rod *e'* to the crank *k* of shaft *p*. The drawings show the relative positions of the arms and cranks at the beginning and termination of the piston-stroke. The arms on the same rock-shaft stand at an angle of forty-five degrees with each other, and the corresponding arms on the two rock-shafts stand at an angle of ninety degrees with each other. The arms *d* and *e* are twice the length of the respective cranks *m* and *k*, to which they are coupled. The arms *f* and *g* are of such length that the engine-pistons in their movements will rock the independent rock-shafts *q* and *q'* through a quarter-circle, or ninety degrees, and in moving once to and fro through this arc the arms *d* and *e* will impart a full rotation to the crank-shaft *p*. The proportions of the arms on the rock-shaft are such that the chord of the arc of ninety degrees traversed by the shorter arms is equal in length to the longer arm. Hence, although the arms are of unequal length, they travel at the points when they are coupled to the connecting-rods precisely the same distance measured on a line parallel with a plane passing through the axis of the crank-shaft *p* and the two rock-shafts.

*h* and *i* are cross-heads on the respective piston-rods *a'* and *b'*.

My engine may be applied to any of the ordinary uses to which engines are applied; but, as it is well adapted for air-compression, I have herein shown it applied to that purpose, *b* representing the cylinder of an air-compressor, the piston of which is connected by a rod *j* with a crank *l* in the power-shaft.

Having thus described my invention, I claim—

1. In an engine, the combination, with a crank-shaft and a reciprocating piston-rod, of a rock-shaft arranged between said piston-rod and crank-shaft, said rock-shaft having two arms of unequal lengths set an angle of forty-five degrees with each other, the shorter arm coupled to the piston-rod and the longer arm coupled to a crank in the crank-shaft, and the connecting-rods, substantially as set forth.

2. In an engine, the combination, with a crank-shaft having two oppositely-arranged cranks and two reciprocating piston-rods, of two independent rock-shafts arranged be-

tween the respective piston-rods and the crank-shaft, said rock-shafts having each two arms of unequal lengths set at an angle of forty-five degrees with each other, the shorter arms on the said rock-shafts being coupled by connecting-rods to the respective piston-rods and the longer arms being coupled by connecting-rods to the respective cranks on the crank-shaft, and the said connecting-rods, as set forth.

WILLIAM A. PITT.

Witnesses:
E. M. WARNER,
S. J. JONES.