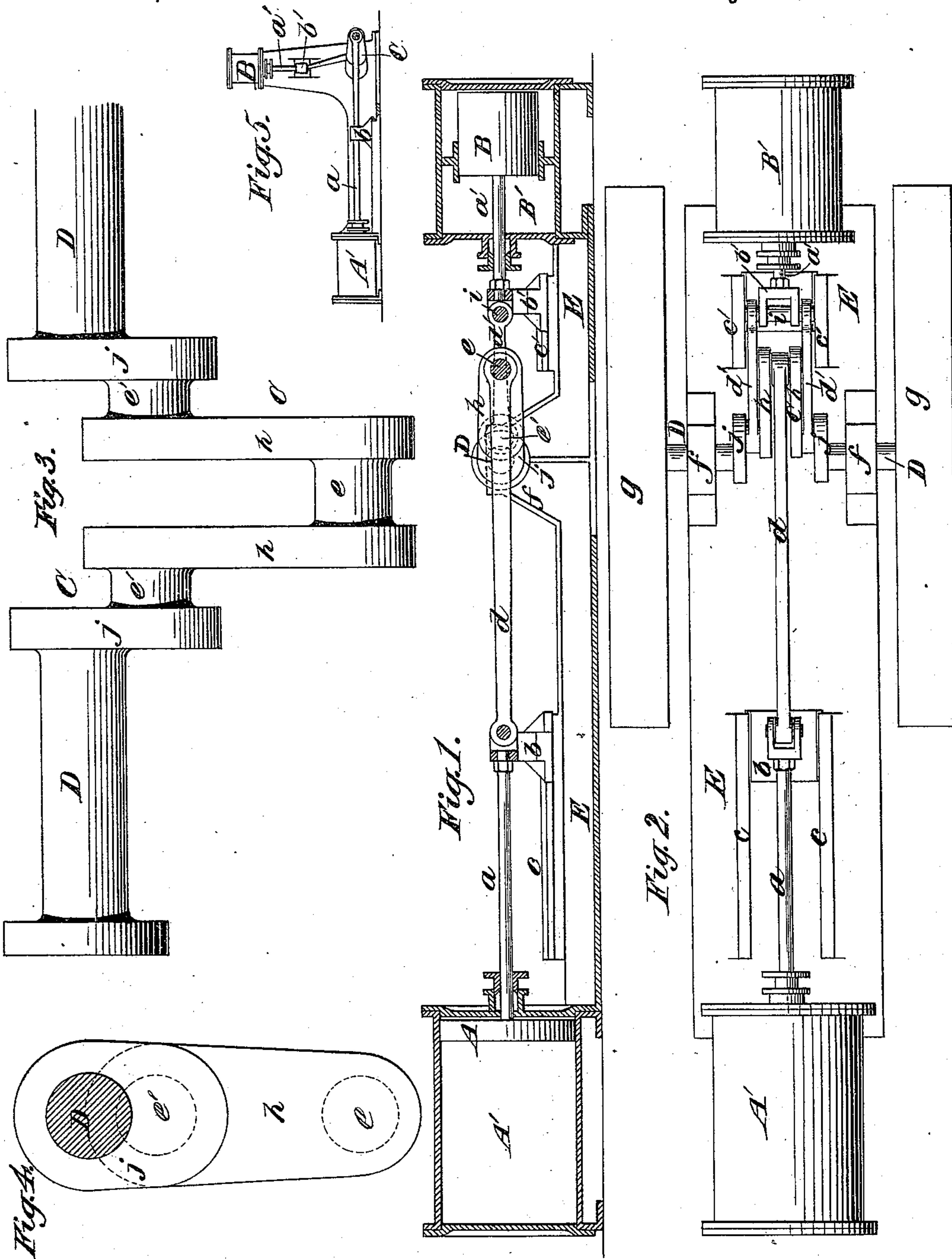


(No Model.)

J. E. T. BARTLETT.  
CRANK CONNECTION.

No. 428,297.

Patented May 20, 1890.



*Witnesses:*

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Olundgren

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# UNITED STATES PATENT OFFICE.

JOHN E. T. BARTLETT, OF NEW YORK, N. Y.

## CRANK-CONNECTION.

SPECIFICATION forming part of Letters Patent No. 428,297, dated May 20, 1890.

Application filed December 12, 1888. Serial No. 293,333. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN E. T. BARTLETT, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Crank-Connections for Pumping, Compressor, and other Engines, of which the following is a specification, reference being had to the accompanying drawings.

It has been found in practice that a much higher speed is required for the pistons of steam-cylinders than for the pistons of pumps or compressors employed for pumping liquids or for pumping or compressing elastic fluids.

The object of my invention is to provide for these differences of speed between the steam or motor piston and the pump-piston in a very simple and effective manner; and to this end my invention consists in the combination hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a vertical longitudinal sectional view of an engine embodying my invention; Fig. 2, a plan view of the same corresponding to Fig. 1; Fig. 3, a plan view, and Fig. 4 an end view, of a two-throw crank; and Fig. 5 is a diagram representing a side view of a pump and motor, illustrating a modification of my invention.

Like letters of reference indicate corresponding parts in all the figures.

A designates a driving or motor cylinder piston; B, a driven or pump-cylinder piston of shorter stroke than the driving-piston. In this example the stroke of the former is represented as nearly or quite three times longer than that of the latter. The driving-piston may be that of a steam-cylinder and the driven piston that of a pump for compressing or pumping elastic fluids or liquids.

C designates a two-throw crank on the engine or crank shaft D, to which crank the pistons may be connected in any suitable manner, as in this example, by the usual connecting-rods pivotally connected with the piston-rod cross-heads and with the crank-pins, the throw of the crank-pins corresponding severally to the stroke of the pistons to which they are connected.

The cylinders must be attached rigidly and

firmly in the usual manner to a suitable frame or frames or engine-bed or bed-plate E E.

A' designates the driving-piston cylinder, and B' the cylinder of the driven piston; *a* and *a'*, piston-rods; *b* and *b'*, cross-heads; *c* and *c'*, cross-head guides; *d* and *d'*, connecting-rods; *e* and *e'*, crank-pins or wrist-pins of the compound two-throw crank.

*ff* indicate bearings for the engine or crank-shaft, and *g g* fly-wheels on said crank-shaft.

The central cross-section of the single central long-throw crank-pin *e*, to which the driving or motor piston is connected, is located in the vertical plane of the axis of the driving or motor piston cylinder, and in this example is also located in the vertical plane of the driven or pump cylinder axis, and the crank-pin *e* is formed between the inner faces or sides of two long-throw crank-arms *h h*. Upon the outer faces or sides of the opposite ends of said arms, upon opposite sides of the central long-throw crank-pin, are the two short-throw crank-pins *e'* and *e'*, to which the pump-piston is connected by the parallel connecting-rods *d' d'*, pivoted on pins *i i* of the cross-head *b'* on opposite sides of the driven or pump piston-rod *a'*. The ends of the two crank-pins *e'* and *e'*, respectively opposite to the arms *h h*, are severally and rigidly connected to the shaft D by the short-throw crank-arms *j j*. By means of this construction the central long-throw crank-pin *e*, arms *h h*, and end of rod *d*, connected to said pin, will, in making a revolution, pass freely between the connecting-rods *d' d'*, and the force applied to the crank-pin *e* through the connecting-rod *d* will be transmitted through the two crank-pins *e' e'* at equal distances from the crank-pin *e* on opposite sides of it, and hence there will be no tendency to cramp the shaft in the bearings *ff*, which are outside the crank on opposite sides thereof.

The compound two-throw crank may be "built up" in separate pieces, or it may be forged and be "machine-dressed" to the required form.

This kind of compound crank may be adapted to a single engine with a fly-wheel or to a two or three cylinder compound engine, or to a triple or quadruple expansion-engine, and

the several compound two-throw cranks can be so disposed at such angles with each other as to secure the best results by connecting two or three or more of said cranks together, and  
5 the axial lines of the piston-cylinders may be at any required angle with each other—as, for example, the said axial lines may be coincident with each other, as represented in Figs. 1 and 2, or at an angle, as represented  
10 in the diagram, Fig. 5.

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

The combination, with the motor-piston of an engine and a pump-piston to be driven  
15 thereby, of a shaft, two bearings for the said

shaft, a two-throw crank in said shaft arranged between said bearings and having a single central crank-pin of a longer throw and two outer crank-pins of shorter throw arranged in line with each other on opposite sides of  
20 said central crank-pin, a connecting-rod between the motor-piston and said central crank-pin, and two connecting-rods, one for each of said outer crank-pins, between the latter crank-pins and the pump-piston, substantially  
25 as herein described.

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Witnesses:

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