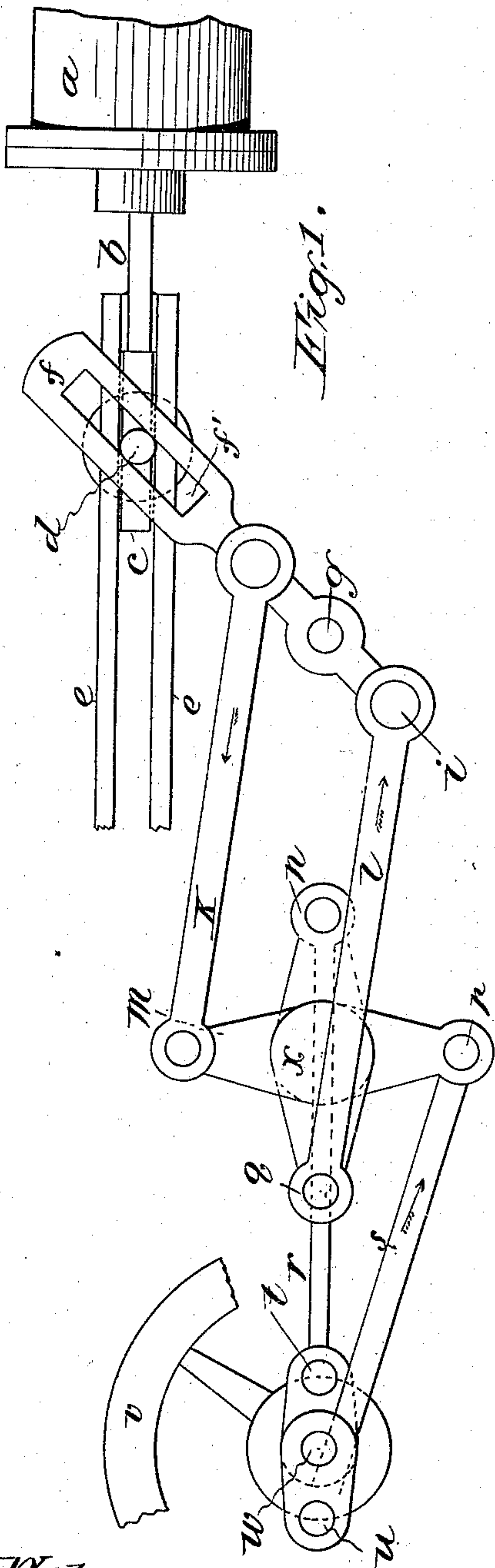


(No Model.)

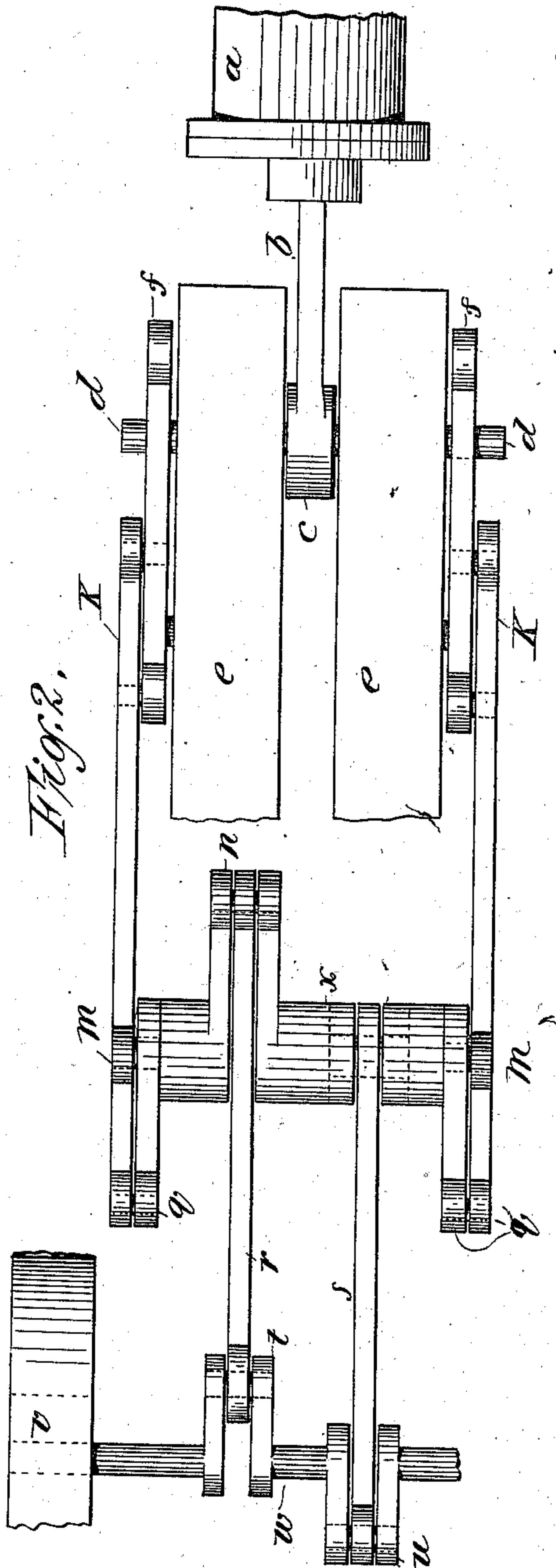
W. A. PITT.
CRANK AND LEVER MOTION.

No. 382,189.

Patented May 1, 1888.



Witnesses.
O. W. Benjamin.
J. C. W. Bachman



Inventor.
William A. Pitt.
By H. Newell.
his Atty.

UNITED STATES PATENT OFFICE.

WILLIAM A. PITT, OF GLENBROOK, CONNECTICUT.

CRANK AND LEVER MOTION.

SPECIFICATION forming part of Letters Patent No. 382,189, dated May 1, 1888

Application filed June 30, 1887. Serial No. 243,049. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. PITT, a citizen of the United States, residing at Glenbrook, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Crank and Lever Motions, of which the following is a full, clear, and exact specification, reference being had to the drawings accompanying and forming a part of the same.

My invention relates to improvements in engines intended to produce a to-and-fro motion; and the objects of my improvement are to secure economy in the expenditure of power and provide means for ratioing such power (constant power) as to produce different results proportionately equal to the initial amount of steam employed. I attain these results by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side view, the bed or frame of the engine not being shown; and Fig. 2 is a top plan view thereof, the two figures showing clearly the nature of my improvement.

Let *a* represent the steam-cylinder, and *b* the piston-rod of the same.

c is a cross-head fixed on the piston rod *b*, which has a longitudinal play in guideways formed by the fixed blocks *e e*.

f f represent levers, each provided with a slot, *f'*, and connected through the same by means of the pins or rod *d* with the cross-head *c*.

g represents fixed pivots on which the levers *f* are respectively mounted.

k k are rods which connect the levers *f* with the cranks *m*, mounted on the shaft *x*. Below these rods are arranged similar rods, *l*, which connect the lower ends of the levers *f* with other cranks, *q*, set at right angles to the cranks *m* and on the same shaft, *x*. On the same shaft, *x*, are also set at right angles to each other and to the other cranks, *m* and *q*, two other cranks, *n* and *p*, which are connected by means of rods *r* and *s* with two cranks, *t* and *u*, mounted on the main working-shaft *w* and set on the same plane, but of only one-half of the length of the cranks heretofore described. The shaft *w* turns in suitable bearings in the bed or frame, carrying a fly-wheel, *v*.

In operation the outward thrust of the piston-rod *b* operates the lever *f*, which, through its connecting-rods *l*, makes a downward pull on the cranks *q* and causes the shaft *x* to revolve one-fourth of a circle, and in so doing moves upward and to the right the crank *p*, which by means of the connecting-rod *s*, causes crank *u* to make a half-revolution on the horizontal line through the center of its motion and directly in line through the center of the crank and crank-shaft *p* and *x*. While this operation is taking place the connecting-rods *k*, connecting the levers *f* with crank *m* and shaft *x* at an equal distance above its fulcrum, operate the crank *m* the same as described at *q*, and in turn move the crank *n*, the same as described at *p*, causing the crank *t*, by means of the connecting-rod *r*, to effect a half-revolution of the shaft *w* simultaneously with the crank *u*.

It will be observed that the direct-transmitting power-cranks are set at right angles, as also are the working-cranks, and on the same shaft. This I effect for two reasons—first, to overcome the dead-center loss in the transmission of power from one end of a single cylinder to a given shaft, and, secondly, to effect a full and uniform power throughout the entire engine from the start to the finish of its stroke, an equivalent in power always being had for the power expended, the full duty of the steam being expended, and all loss of power in the engine due to such expansive use is compensated for by the increased leverage shown in the mechanism.

The leverage shown in the drawings and hereinbefore described is designed to be used with a single steam-cylinder, so that a like operative effect is produced from each to and each fro thrust of the steam-piston; but as this leverage is also designed to be used in the transmission of its power by a single thrust of the piston to cause a half-revolution of a gear-crank instead of causing a whole revolution, as above stated, I discard one set of cranks, as *m m*, and their rods *k k*, or the cranks *q q* and their rods *l l*, (either set, as may be desirable,) as shown in the present arrangement, and the discarded cranks are then set on the same respective shafts, only operated by an

additional piston-rod—that is, I employ two steam-cylinders instead of one, as herein shown.

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

1. The combination of levers having a pin-and-slot connection with the cross-head, rods connecting said levers with a set of cranks at right angles on the same shaft, and rods connecting another pair of cranks similarly mounted on the said shaft with cranks set on the same plane on the main driving shaft, as and for the purpose set forth.

2. The combination of shaft *x*, cranks *m m*, *q q*, and *p n*, connecting-rods *k k l l*, levers *f f*, cranks *t u*, and connecting-rods *r s*, all arranged as and for the purpose set forth.

3. The combination of levers *f f*, cross-head *c*, moving in guideways *e*, cranks *m m* and *q q*, connecting-rods *k k l l*, cranks *n* and *p*, rods *r s*, and cranks *t u*, all arranged and operated as set forth.

4. The combination of cranks *m m* and *q q*, set at right angles on the same shaft, levers *f f*, connecting-rods *k k l l*, and the cranks *n p*, mounted on the same shaft at right angles to each other and to the cranks *m m* and *q q*, with cranks *t* and *u*, set on the same plane, shaft *w*, and connecting-rods *r* and *s*, as set forth.

WILLIAM A. PITT.

Witnesses:

S. J. JONES,

E. M. BROWN.