(No Model.)

D. P. KANE.

STEAM ENGINE.

No. 306,930. Patented Oct. 21, 1884.

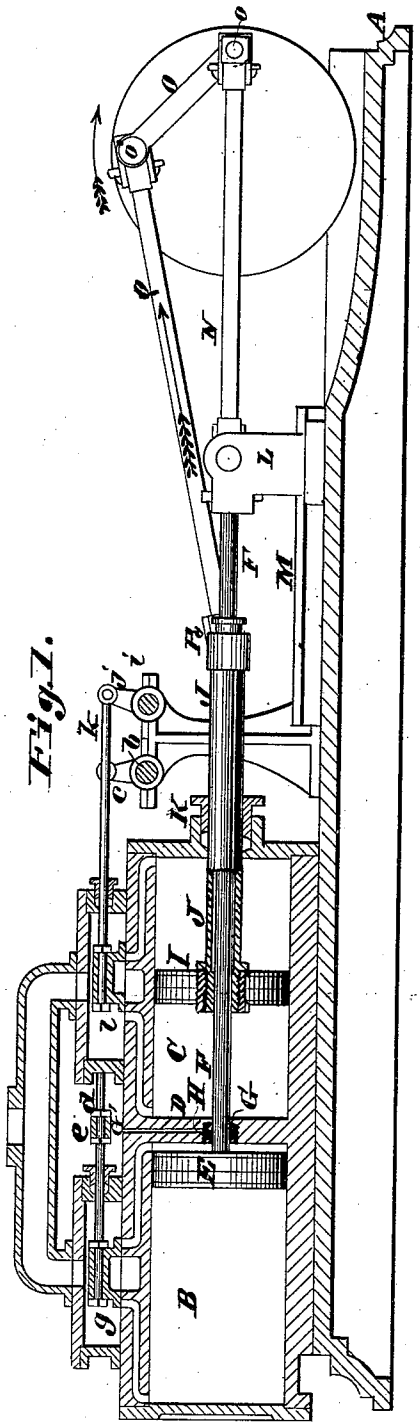


Fig. 1.

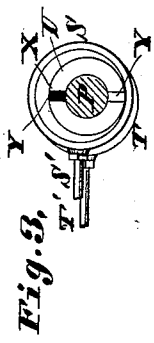


Fig. 3.

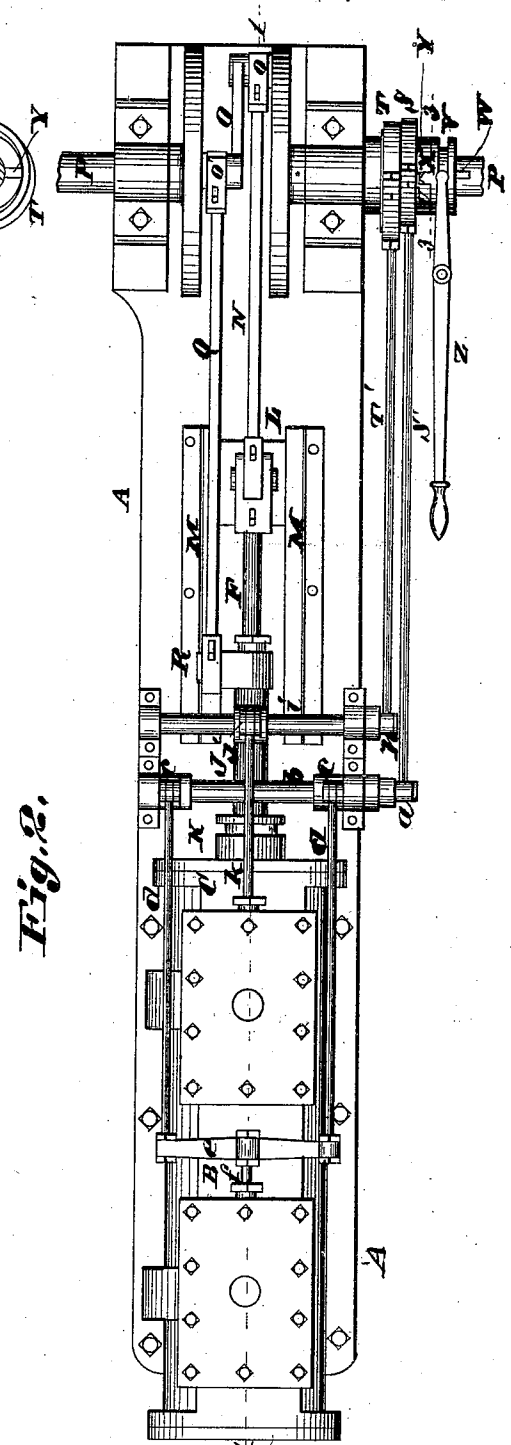


Fig. 2.

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UNITED STATES PATENT OFFICE.

DANIEL P. KANE, OF ST. LOUIS, MISSOURI.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 306,930, dated October 21, 1884.

Application filed March 17, 1884. (No model.)

To all whom it may concern:

Be it known that I, DANIEL P. KANE, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Steam-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This engine has two pistons provided with wholly independent steam-connection working in separate and distinct cylinders in line with each other, and one piston-rod working centrally within the other. The piston-rods are connected to a compound crank so formed that the cranks are carried over their "dead-centers." The eccentrics are upon a single hub connected to the main shaft by a sliding clutch having a tooth engaging in one of two recesses upon the eccentric, according to the direction in which the main shaft is turning.

Figure 1 is a longitudinal section at 1 1, Fig. 2. Fig. 2 is a top view of the engine. Fig. 3 is a side view of the eccentrics.

A is the engine-bed.

B and C are two distinct engine-cylinders fixed upon the bed in line with each other, and separated by a fixed diaphragm or partition, D. The cylinders are shown as made in one casting. In the cylinder B works a piston, E, whose rod F passes through a stuffing-box, G, in the partition D.

H is a screw-gland of the stuffing-box.

I is a piston working in the cylinder C. This piston has a tubular piston-rod, J, through which the piston-rod F passes centrally.

K is the stuffing-box, through which the piston-rod J works. The piston-rod F is firmly connected to a sliding head, L, working on guides M, that is connected by a rod, N, with a wrist, *o*, upon a compound crank, O, of the main shaft P.

o' is a crank-wrist set at right angles with the wrist *o* upon the crank O, so that when one wrist is at a dead-center the other is at half-stroke, so that the rod acting on one wrist carries the other wrist over its dead-centers. The wrist *o'* is connected by a rod, Q, to a wrist, R, fixed upon the side of the tubular piston-rod J. S and T are the eccentrics, secured to a hub, U, turning freely on the main shaft P, except when clutched thereto by the sliding clutch V, that works on a spline or feather, W, upon the main shaft. The clutch has a tooth, X, that may be engaged in either of the two notches Y of the hub, according to the direction in which the engine-shaft P is desired to turn. When it is desired to reverse the engine, the clutch-tooth X is drawn out of the notch Y, and as the clutch-collar V turns relatively to the hub U the tooth is forced into the other notch Y, and the movement of the valves is changed. The clutch-collar is moved along the main shaft to engage and disengage the tooth X by a lever, Z, whose forked end has studs entering a circumferential groove of the clutch-collar, as usual. The eccentric-rod S' is connected to the arm *a* of a rock-shaft, *b*, that has arms *c*, connected by rods *d* to the ends of a cross-head, *e*, to whose middle the valve-rod *f* of the slide-valve *g* is connected. The eccentric-rod T' is connected to the arm *h* of rock-shaft *i*, having an arm, *j*, to which is connected the valve-stem *k* of the slide-valve *l*.

No novelty is claimed in the construction of the slide-valves, steam ports, or steam-chest. Any suitable valves may be used to govern the entrance and exit of steam to and from the cylinder.

I have stated that the two crank-wrists *o o'* are set at an angle of ninety degrees, or at a right angle, to each other. This I believe to be the best arrangement; but I do not confine myself to any angle of variation. The piston-rod F is lubricated by oil fed to the stuffing-box G through an oil-hole, G'.

It will be seen that in my engine the cylinders have not any connection with each other, and therefore I can supply the steam to each piston just at the right time and "cut off" without affecting the other piston in the least. Thus, though the pistons are at times traveling in the same direction and sometimes in opposite directions, and at continually-varying speeds, yet one never acts as a clog on the other or on the main shaft, to which both of their cranks are secured.

My pistons have, as already stated, wholly independent steam-connection.

In my engine one of the pistons can be dis-

connected from the crank-shaft and the shaft actuated by the other. This might be required in case of the disabling of part.

I am aware that cylinders have been arranged one in advance of the other; that cylinders arranged one in advance of the other have been separated by a fixed partition; that cylinders arranged one in advance of the other have been provided with pistons having rods sliding one within the other, and that piston-rods have been connected to cranks set angularly on the shaft. Such construction therefore, considered separately, I do not claim.

I claim as my invention—

The combination of a main shaft, two disconnected pistons, two separate and distinct cylinders in line with each other, in which the pistons work, two concentric piston-rods sliding one within the other, and two cranks set obliquely to each other on the main shaft, and to which the pistons are connected.

DANIEL P. KANE.

Witnesses:
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