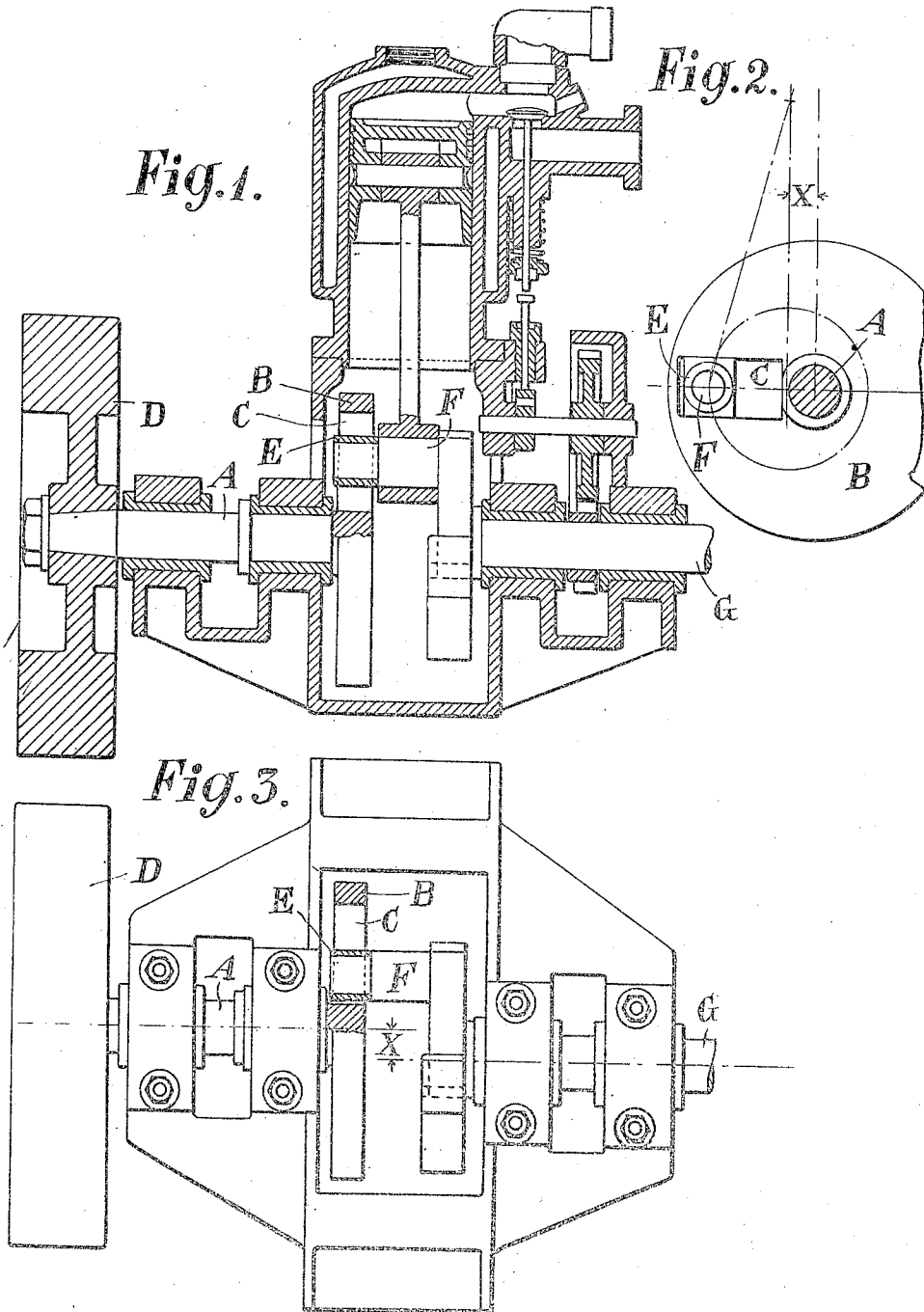


J. P. N. NIELSEN.
 RECIPROCATING PISTON ENGINE.
 APPLICATION FILED SEPT. 5, 1912.

1,058,457.

Patented Apr. 8, 1911.



Witnesses:-

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UNITED STATES PATENT OFFICE.

JOHAN FREDRIK NIKOLAI NIELSEN, OF FREDRIKSSTAD, NORWAY.

RECIPROCATING-PISTON ENGINE.

1,058,457.

Specification of Letters Patent.

Patented Apr. 8, 1913.

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To all whom it may concern:

Be it known that I, JOHAN FREDRIK NIKOLAI NIELSEN, a subject of the King of Norway, residing at Fredriksstad, Norway, have invented certain new and useful Improvements in Reciprocating-Piston Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification:

This invention relates to certain novel and useful improvements in reciprocating piston-engines and it comprises the features of construction and parts thereof, which will hereinafter be fully described and specified with reference to the accompanying drawings, where:

Figure 1 is a vertical sectional view through a piston-engine and its crank. Fig. 2, represents the crank-arrangement alone and Fig. 3 is a plan of the same.

A is the fly-wheel shaft on which the fly-wheel D is fixed.

B is a disk forged on the flywheel-shaft A and provided with a slot C. In this slot is slidably mounted a bearing E for the end of the crank pin F. The driving-shaft G is parallel to the flywheel-shaft A and lies in the same horizontal plane. It is however not in line with the flywheel-shaft *g* but is placed a distance *x* to the side (see Figs. 2 and 3). The crankpin F being integral with the driving shaft and at the same time also journaled in the bearing E in the guide-slot C, will therefore perform a radial movement relative to the disk B during its rotation. In the position shown on Fig. 2, corresponding to the midway position of the descending piston, the crank pin F is at its largest distance from the center of the disk, and thus has the longest arm relative to the flywheel-shaft A.

During the upward movement of the piston the arm gets shorter and reaches its

shortest length on the piston passing its midway position. By placing the flywheel-shaft thus relative to the crankshaft is obtained the advantage of a much smoother running of the machine. The object of the flywheel being to take up irregularities in rotation it is clear that it will always rotate quicker during expansion than during compression. With the usual crank arrangements this will therefore also be the case with the crankshaft.

By the arrangement hereby specified and illustrated it will be easily seen that the half-turn of the flywheel-shaft during which the rotation of same is quickest, corresponds to more than one half turn of the crankshaft and vice versa, and the part of a turn of the crank-shaft corresponding to each of the half-turns of the flywheel-shaft, can be adjusted by changing the distance *x* between the two shafts. By this arrangement a thoroughly even and quiet running of the crank-shaft is obtained without an inordinately heavy flywheel, and hereby there is gained a great advantage also regarding the efficiency of the machine.

The invention can be advantageously adapted to pumps as well as to motors, with approximately the same effect and the connection between the two shafts can be carried out differently without parting from the spirit of the invention.

Claims.

1. In a reciprocating piston engine the combination with a driving-shaft of a flywheel-shaft connected with said driving shaft by means of an arrangement comprising a crank-pin and a rotating disk, said disk being mounted eccentrically to said crank-pin and provided with a slot for guiding the crank-pin therein, all with the object of varying the ratio of revolutions of the said two shafts for the purpose of securing a smooth and efficient working of the engine.

2. In a reciprocating piston engine the combination with a driving-shaft of a flywheel-shaft connected with said driving

shaft by means of an arrangement comprising a crank-pin and a rotating disk, said disk being mounted on the flywheel-shaft which is parallel to but not in alinement with the crank-shaft the disk being provided with a slot for guiding the end of the said crank-pin by means of a slidable bearing.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

JOHAN FREDRIK NIKOLAI NIELSEN.

Witnesses:

M. E. C—,

SIGUE BÖE.