(No Model.)

J. HARRIS.

ENGINE.

No. 474,557. Patented May 10, 1892.

Fig. 1.

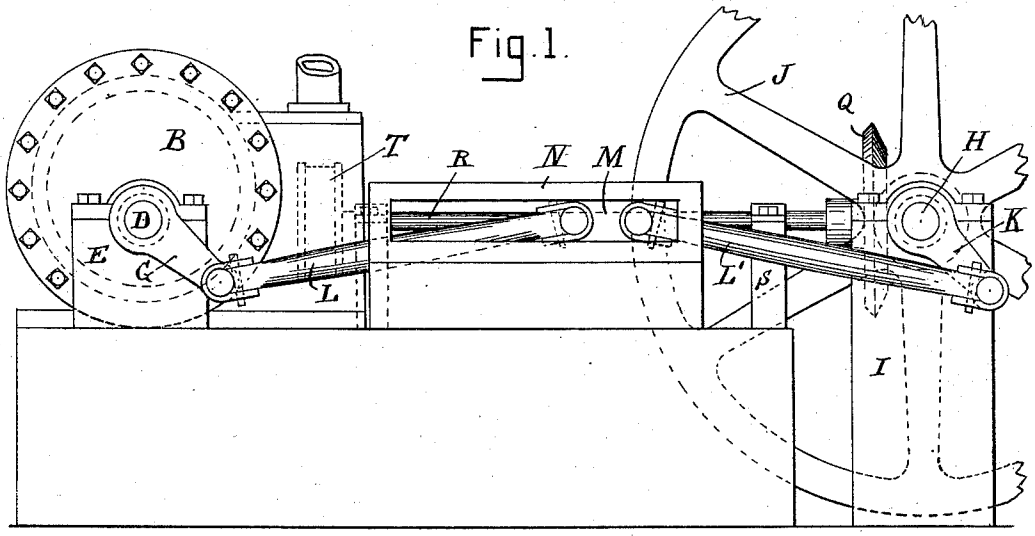
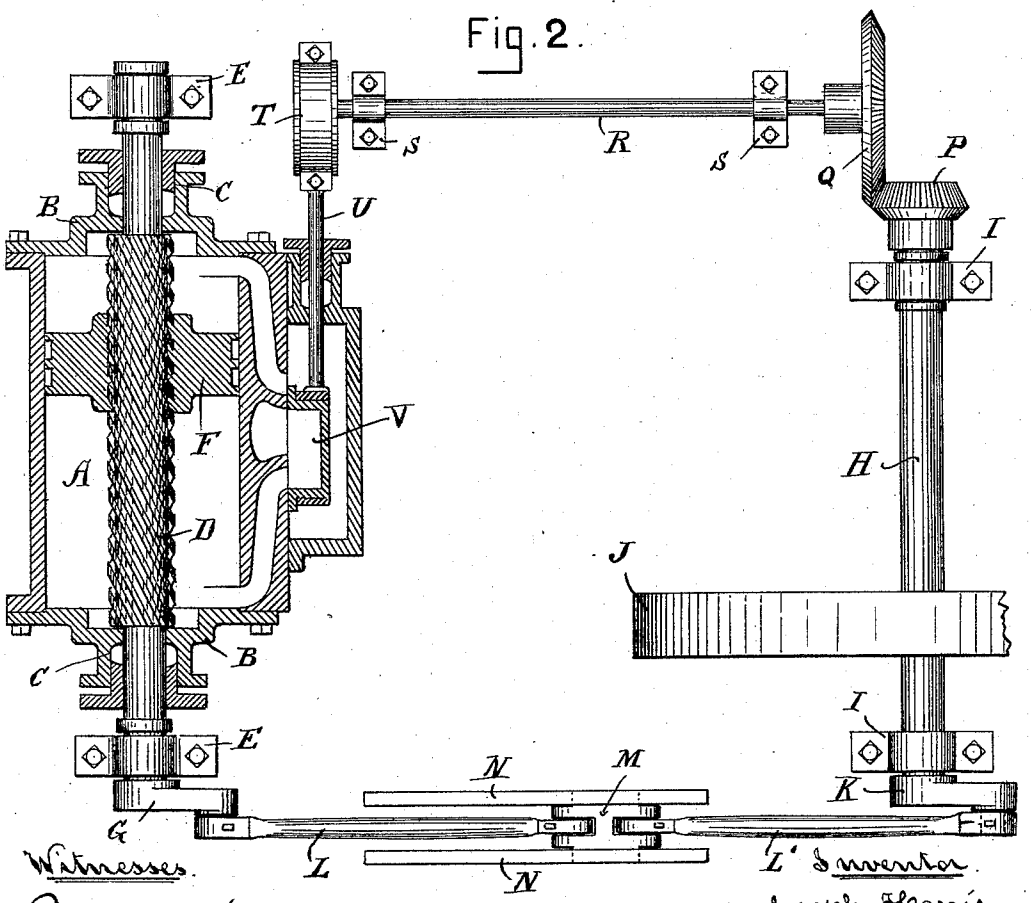


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOSEPH HARRIS, OF BOSTON, MASSACHUSETTS.

ENGINE.

SPECIFICATION forming part of Letters Patent No. 474,557, dated May 10, 1892.

Application filed October 9, 1891. Serial No. 408,265. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH HARRIS, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Engines, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of my invention is to produce an engine in which the main or driving shaft will be caused to make one revolution for every stroke of the piston, thereby causing the shaft to rotate at double the speed that it would if the engine was of ordinary construction.

The invention consists of a screw-threaded shaft mounted in a cylinder of ordinary construction and a nut or piston having a corresponding screw-thread working upon said shaft, the nut or piston being held so that it cannot rotate, thereby imparting a rotary motion to the shaft as it (the nut) travels from one end of the cylinder to the other and a reverse rotary motion as it travels in the opposite direction, and in certain details of construction, as hereinafter fully described, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 represents a side elevation of an engine embodying my invention. Fig. 2 is a plan view showing the cylinder in section.

A represents the cylinder, which may be of ordinary construction; B, the covers, which are each provided with a stuffing-box C.

D is the shaft that passes through the cylinder, but somewhat out of the center, as will be best seen in Fig. 1, and it is carried at each end by a bearing E. The central portion of this shaft D—that is, the portion within the cylinder—is of larger diameter than the ends and is formed with a screw-thread of very steep pitch. I prefer to employ what is known as a "four-threaded" screw.

F is a nut or piston formed with a screw-thread to correspond with the thread on the shaft D. It will be seen that as the shaft D is out of the center of the cylinder the piston F cannot turn thereon; but as the piston is forced by the steam or other fluid from one end to the other of the cylinder the shaft D is caused to rotate once in one direction, (if the screw is of a length as shown.) When the piston travels in the opposite direction, the shaft would again be rotated once, but in the reverse direction, thus imparting an oscillating motion to the crank G on the end of the shaft D.

H is the main shaft of the engine, mounted in suitable bearings I. Upon this shaft is secured a fly-wheel J, and upon one end of said shaft H is secured a crank K, that is connected to the crank G by rods or pitmen L L′ and slide M, that works in guides N. Upon the other end of the shaft H is mounted a bevel-wheel P, that is in gear with a bevel-wheel Q, twice the diameter of the wheel P, said wheel Q being mounted upon a shaft R, carried in bearings S. Upon the other end of the shaft R is secured an eccentric T, that by rod U operates the slide-valve V. The object of having the wheel Q twice the diameter of the wheel P is that the steam admitted to the cylinder A will be cut off at the proper moment, for as the shaft H is caused to make one revolution to each stroke of the piston F the slide-valve V has to be reversed only at the completion of each of such revolutions.

The operation is as follows: Steam or other fluid being admitted to one end of the cylinder A, the nut or piston F is forced to the opposite end, and as it is mounted eccentrically upon the screw D it cannot turn in the cylinder, but forces the screw D to rotate in one direction during the travel of the nut or piston; but when steam is admitted at the other end of the cylinder the nut or piston will cause the screw to be rotated in the opposite direction. Thus an oscillating motion is given to the crank G, which, being by rod L connected to the slide M, imparts a reciprocating motion thereto and by the rod L′ imparts a rotary motion to the crank K, the momentum of the fly-wheel J causing the crank K to always turn in the direction in which it has been started, the shaft H, through bevel-gears P Q, shaft R, and eccentric T, operating the slide-valve, as before described.

Although I have shown and described the screw D of such a length as to be caused to rotate once for each stroke of the piston, it might be made shorter or longer, if desired, so that the piston will cause it to make one-

half or one and one-half or even two revolutions, and instead of operating the slide-valve from the main shaft H by bevel-wheels any other suitable means may be employed.

What I claim is—

1. In an engine, a cylinder having a screw-threaded shaft passing eccentrically through it and a nut or piston having a corresponding screw-thread and free to travel upon said shaft from end to end of the cylinder, but not turn therein, substantially as set forth.

2. In an engine, a cylinder having a screw-threaded shaft passing through it, a nut or piston having a corresponding screw-thread, whereby said shaft is caused to oscillate as the nut or piston travels, and a crank on the end of said shaft, in combination with a main shaft, a fly-wheel mounted thereon, and means for imparting a continuous rotary motion to said main shaft from the crank on the screw-shaft, and also means for operating the slide-valve from the main shaft, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 5th day of October, A. D. 1891.

JOSEPH HARRIS.

Witnesses:

GEORGE DENNISON,

EDWIN PLANTA.