No. 641,643. Patented Jan. 16, 1900.

J. HARRIS.

STEAM ENGINE.

(Application filed Oct. 9, 1899.)

(No Model.)

Fig. 1.

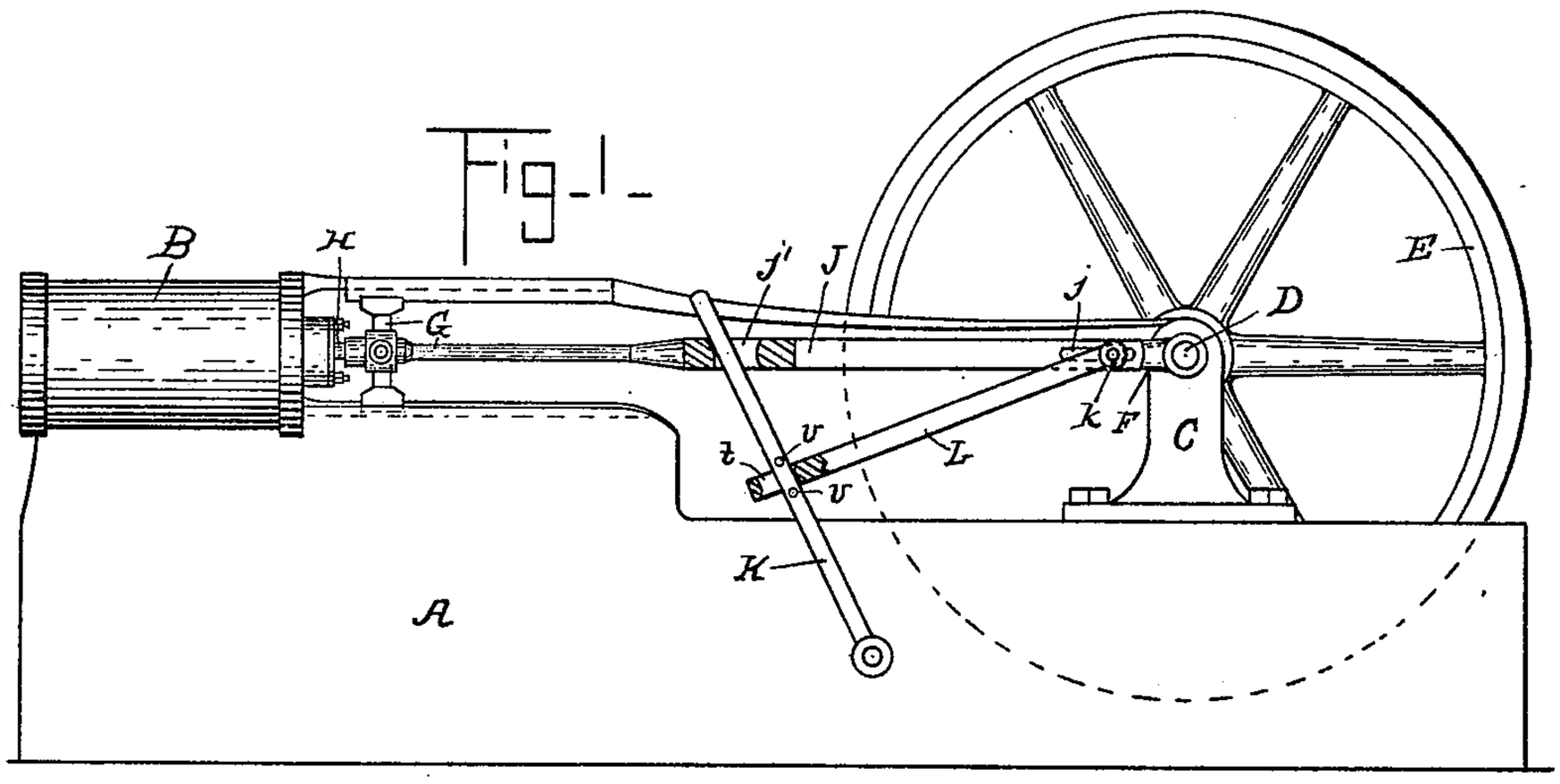


Fig. 2.

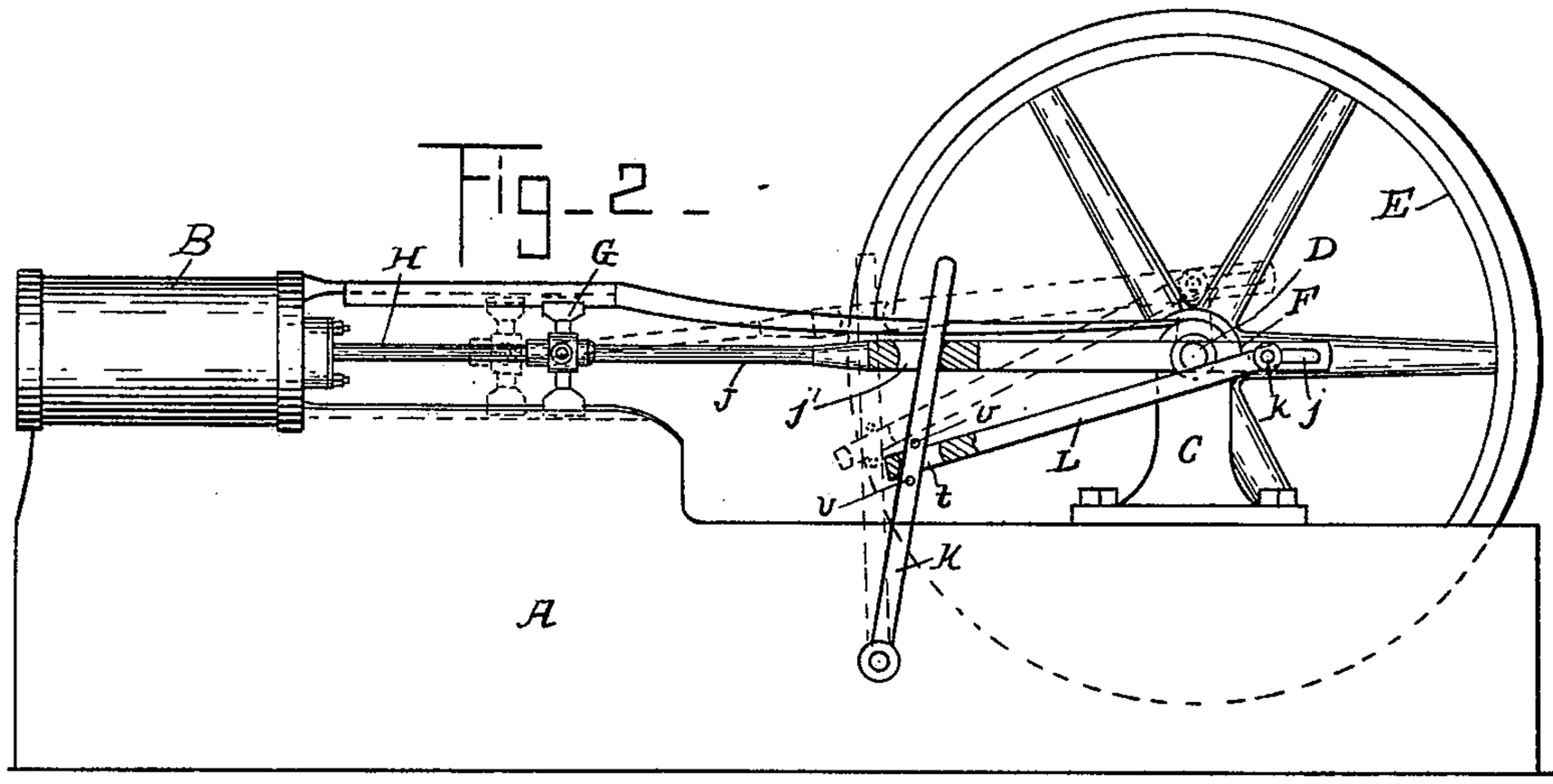
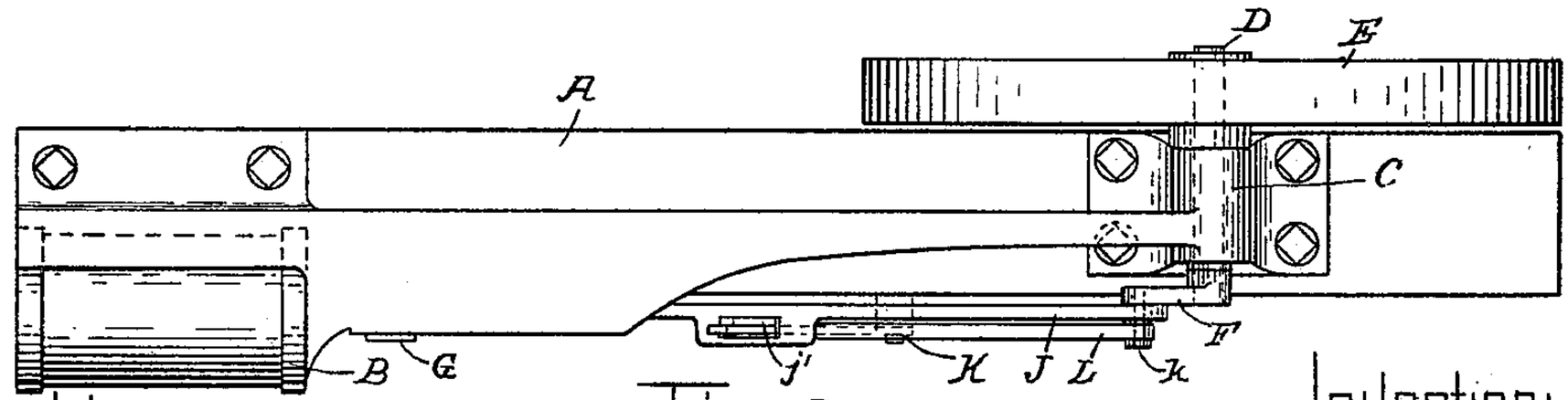


Fig. 3.



Witnesses:
H. B. Davis,
Winifred G. Kenwin

Inventor:
Joseph Harris
by Edwin Bladen
attorney.

UNITED STATES PATENT OFFICE.

JOSEPH HARRIS, OF BOSTON, MASSACHUSETTS.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 641,643, dated January 16, 1900.

Application filed October 9, 1899. Serial No. 733,030. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH HARRIS, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification.

The object of my invention is to produce a single-cylinder steam-engine without a dead-center; and the invention consists of a lever and what I term an "auxiliary connecting-rod," so arranged that when the crank and the rod connecting the cross-head and the crank are in a straight line the auxiliary connecting-rod will operate the crank, as hereinafter set forth, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a side view of an engine embodying my invention, showing the position of the crank and connections when the piston is at one end of its stroke. Fig. 2 is a similar view when the piston is at the other end of its stroke. Fig. 3 is a plan view of same.

A represents a bed to which is secured a cylinder B and a standard or standards C, in which is mounted a shaft D, upon one end of which is secured a fly-wheel E and on the other end a crank F.

G is the cross-head, H the piston-rod, and J the connecting-rod. Instead of the ordinary connecting-rod this rod J is formed, at its outer end, with a slot *j*, through which the wrist-pin *k* passes, and it is also formed with a central slot *j'*.

K is a lever fulcrumed to the bed, the upper end of said lever passing through the slot *j'* in the connecting-rod J, and L is an auxiliary connecting-rod having at one end a slot *t*, through which the lever K also passes and is held in place by pins *v v*, passing through said lever K. The other end of the auxiliary connecting-rod L is formed with a hole through which the wrist-pin *k* passes.

In operation, when the piston is back, so as to cause the crank to assume the position shown in Fig. 1, in which the crank would be on a dead-center, then the crank will be operated by the action of the lever K on the auxiliary rod L, thus altering the pressure from a straight to an angular position, the lever K, bearing upon the rod L, transmitting motion to the crank in an angular direction, thus avoiding a dead-center. This motion is attained by means of the slot *j* in the connecting-rod J, by which said rod is free to slide upon the wrist-pin *k*. After the crank has been carried up for a short distance the end of the slot *j* will come into contact with the wrist-pin *k* and carry it over until the piston has made its full stroke, when it will be in the position shown in Fig. 2, when the backward movement of the piston will cause the lever K to be again operated upon, so that the auxiliary rod L will operate the crank, as before described.

It will be seen that by the above construction the crank F is for a portion of its travel operated directly by the connecting-rod J, and at what would otherwise be the dead-centers of the crank F said crank is operated by the auxiliary rod L, to which motion is imparted by the lever K, the connecting-rod F being free to slide on the wrist-pin K by means of the slot *j*.

What I claim is—

1. In a steam-engine, a connecting-rod having a slot and a wrist-pin passing through same, in combination with a lever and an auxiliary connecting-rod; substantially as and for the purpose set forth.

2. In a single-cylinder engine a device for preventing dead-centers, consisting of a connecting-rod having a slot, a wrist-pin passing through same, an auxiliary connecting-rod, fulcrumed on said wrist-pin, and a lever passing through slots in both the connecting-rods, whereby the motion is transmitted to crank by the auxiliary connecting-rod, when the crank is on the dead-centers, as set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOSEPH HARRIS.

Witnesses:
CHAS. STEERE,
EDWIN PLANTA.