

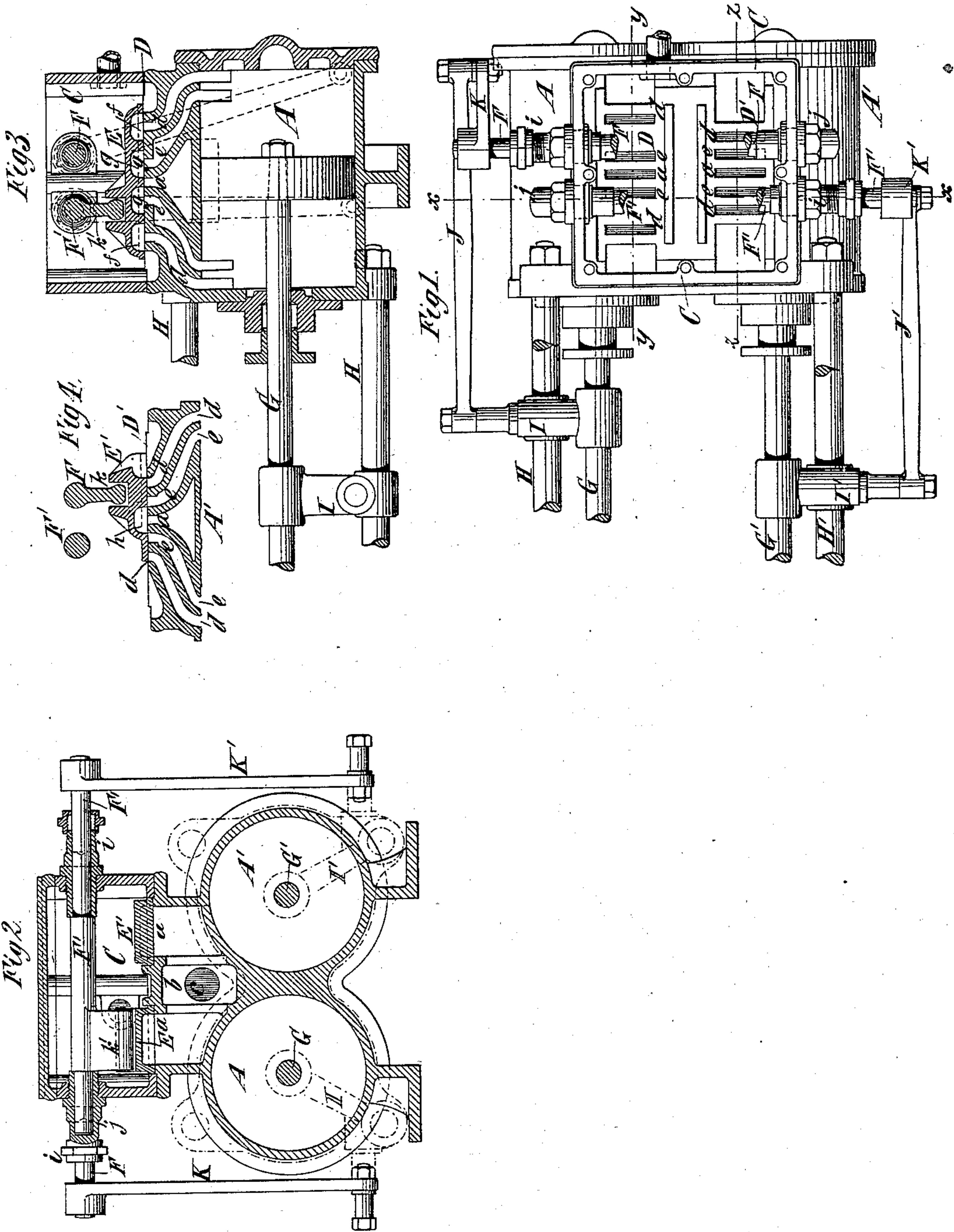
(No Model.)

W. H. GUILD.

DUPLEX DIRECT ACTING ENGINE.

No. 278,133.

Patented May 22, 1883.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

WILLIAM H. GUILD, OF BROOKLYN, NEW YORK, ASSIGNOR TO GUILD & GARRISON, OF SAME PLACE.

## DUPLEX DIRECT-ACTING ENGINE.

SPECIFICATION forming part of Letters Patent No. 278,133, dated May 22, 1883.

Application filed March 29, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. GUILD, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Duplex Direct-Acting Engines, of which the following is a specification.

My invention relates to that class of duplex engines in which the valve of each engine is operated from the moving piston-rod of the other engine; and the principal object of my invention is to simplify the mechanism employed for transmitting movement from the piston-rod of each engine to the valve of the other engine.

The invention consists in the combination, in a duplex engine, with the cylinders, pistons, piston-rods, and two valves—one for each cylinder—of two rock-shafts extending through and journaled in the sides of the valve chest or chests, connected one with each piston, and each extending over the valve of the engine whereby it is operated and engaging with the valve of the other engine. By this construction I am enabled to operate the valves properly and to greatly simplify the mechanism employed for the purpose. I prefer to provide the steam-cylinders with separate induction and eduction ports to and from each end thereof, and I then employ a novel combination of valves, which are hereinafter fully described.

In the accompanying drawings, Figure 1 is a plan of a portion of a duplex engine embodying my invention, the steam-chest, covers, valves, and portions of the rock-shafts being removed, so as to clearly show the valve-seats. Fig. 2 is a vertical section on the dotted line *x x*, Fig. 1. Fig. 3 is a vertical section on the dotted line *y y*, Fig. 1; and Fig. 4 is a vertical section of the valve seat and valve of one of the engines on the dotted line *z z*, Fig. 1.

Similar letters of reference designate corresponding parts in all the figures.

A A' designate the two cylinders of the duplex engine. They are here shown as made integral in one casting, and are surmounted by a single steam or valve chest, C, wherein are the two valve-seats D D'. The steam or valve chest might be divided by a partition, or two entirely separate chests might be provided;

but the construction shown is preferred because of its simplicity.

E E' designate the two valves of the engines, each engine having but a single valve. These valves, as here shown, are simple slide-valves working upon their seats D D'; but their form is different from that of ordinary slide-valves. In each valve-seat D D' is a central exhaust port and cavity, *a*, and the ports and cavities of both engines communicate with a central cavity, *b*, from which extends the exhaust-pipe *c*. In each valve-seat D D' are separate induction-ports *d* and eduction-ports *e* to each end of the cylinder.

The valve E is what I term a "double B-valve," it being provided with four cavities, *f f g g*, the former of which, when the valve moves so as to project beyond its seat, control communication between the steam in the chest C and the induction-ports *d*, and the latter of which control alternately the communication between each eduction-port *e* and the exhaust port and cavity *a*. This valve gives steam in front of it, or, in other words, when moved toward the right it will admit steam to the induction-pipe leading to the right-hand end of the cylinder A, and will place the eduction-port *e*, leading from the left-hand end of the cylinder, in communication with exhaust-port *a*.

The valve E' is what is termed a "single D-valve," and has but one cavity, *h*. This valve admits steam behind it; or, in other words, when the valve is moved toward the right it will admit steam through the left-hand induction-port *d* to that end of the cylinder A', and will establish communication by its cavity *h* between the eduction-port *e*, leading from the right-hand end of the cylinder, and the exhaust-port *a*.

F F' designate two rock-shafts which extend transversely through the chest C, and which are each journaled in a stuffing-box, *i*, in one side of the chest, and a bonnet or plug, *j*, in the opposite side of the chest. The construction of these stuffing-boxes and plugs so as to form bearings for the rock-shafts is shown in Fig. 2.

G G' designate the piston-rods of the engines, and H H' designate braces or tie-rods which connect the engine-cylinders in a well-known



manner with their oppositely-arranged pump or other cylinders, (not here shown.)

Upon the piston-rods  $G G'$  are secured cross-heads or arms  $I I'$ , which are guided on the  
 5 braces or tie-rods  $H H'$ , and which are connected by rods  $J J'$  with arms  $K K'$ , fixed to the portions of the rock-shafts  $F F'$  which project beyond the chest  $C$ . The rock-shafts are provided with toes  $k k'$ , which engage with and  
 10 serve to operate the valves  $E' E$ . The rock-shaft  $F$ , which is operated from the piston-rod  $G$  of the engine-cylinder  $A$ , extends past the valve  $E$  of that engine, and has its toe  $k$  engaged with the valve  $E'$  of the engine-cylinder  
 15  $A'$ . In like manner the rock-shaft  $F'$ , operated from the piston-rod  $G'$ , extends past the valve  $E'$  and engages with and operates the valve  $E$  of the engine-cylinder  $A$ . Therefore it will be understood that each engine operates the valve  
 20 of the other, as is usual in duplex engines.

By my invention I greatly simplify the mechanism required for operating the valves of duplex engines in which each engine operates the valve of the other engine.

25 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a duplex engine, the combination, with the cylinders, pistons, piston-rods, and two  
 30 shafts extending through and journaled in the sides of the valve chest or chests, connected one

with each piston-rod, and each extending over the valve of the engine whereby it is operated and engaging with the valve of the other engine, substantially as and for the purpose described. 35

2. In a duplex engine, the combination, with the cylinders, pistons, piston-rods, and two valves—one for each cylinder—of a single valve-chest common to both cylinders and containing both valves, two rock-shafts extending  
 40 through and journaled in the sides of the valve-chest, and each connected by a toe with one of the valves, and connections between the piston-rod of each engine and the rock-shaft which  
 45 is connected with the valve of the other engine, substantially as specified.

3. The combination, with the cylinders  $A A'$ , the steam-chest  $C$ , containing the two valve-seats  $D D'$ , each provided with ports  $a d d e e$ ,  
 50 the valves  $E E'$ , the two rock-shafts  $F F'$ , provided with toes  $k k'$ , engaging, respectively, with the valves  $E' E$ , the piston-rods  $G G'$ , and connections between the piston-rod  $G$  and the rock-shaft  $F$  and between the piston-rod  
 55  $G'$  and the rock-shaft  $F'$ , all substantially as described.

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Witnesses:

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