(No Model.)

H. A. JAMIESON.

MEANS FOR TRANSMITTING POWER FROM STEAM ENGINES OR OTHER MOTORS.

No. 251,593. Patented Dec. 27, 1881.

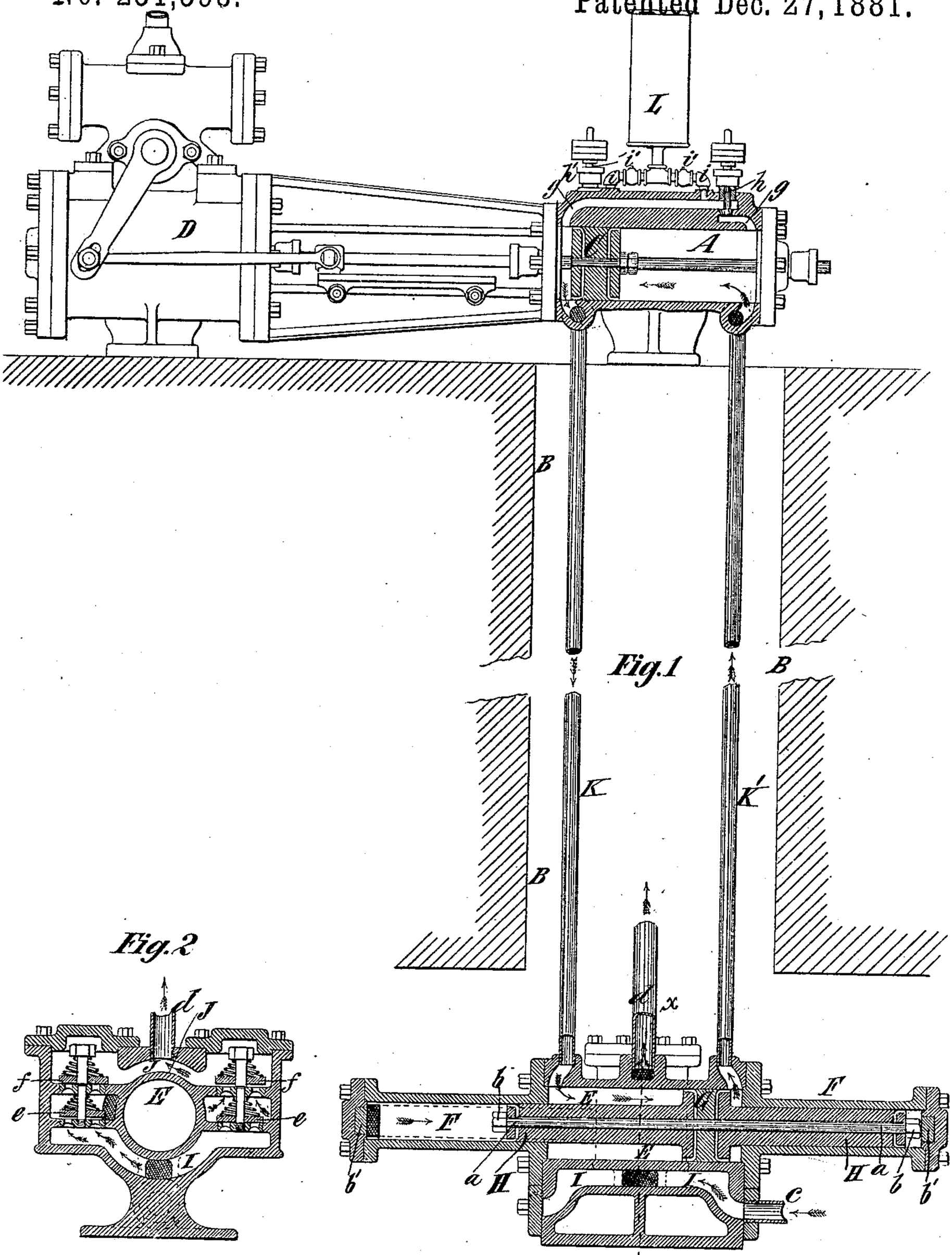

Fig. 1

Fig. 2

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HENRY A. JAMIESON, OF BROOKLYN, NEW YORK.

MEANS FOR TRANSMITTING POWER FROM STEAM-ENGINES OR OTHER MOTORS.

SPECIFICATION forming part of Letters Patent No. 251,593, dated December 27, 1881.

Application filed March 23, 1881. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. JAMIESON, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Means for Transmitting Power from Steam-Engines or other Motors, of which the following is a specification.

My invention relates to mechanism for transmitting the power of a steam-engine or other motor to any distant point—as, for instance, from the top to the bottom of a mine-shaft for working pumps to free the mine of water—without the use of rods, shafting, belts, gearing, or other positive connections.

The object of the invention is to enable water or other incompressible liquid to be practically used as a means of transmitting power, the water or liquid being forced alternately through pipes by the reciprocation of the piston or diaphragm of a steam-engine or other motor, and actuating a piston or diaphragm in a cylinder or chamber at a distant point.

The invention consists in the combination, with two cylinders or chambers and pistons or diaphragms therein, of two pipes for establishing a free communication from the two ends of one cylinder or chamber to the two ends of the other cylinder or chamber, a steam-engine or other motor for reciprocating one of said pistons or diaphragms, and pass-over valves in the cylinder or chamber of the piston or diaphragm so actuated as to permit the liquid to pass from one end thereof to the other end, as hereinafter fully described. When the two cylinders or chambers and their connecting-pipes are filled with water or other liquid the movement of one piston or diaphragm will force the water in front of it through one of the connecting-pipes, and thus produce a simultaneous movement of the other piston or diaphragm, and the power of the actuating piston or diaphragm, when moved in either direction, is transmitted through a water or liquid column and produces a corresponding movement of the other piston or diaphragm, which may operate a pump or perform other useful work. Whenever the piston or diaphragm which is actuated by the liquid completes its stroke the continued motion of the other piston or diaphragm will cause the liquid to pass through one or the other of said pass-over valves and permit the last-said piston or diaphragm to complete its stroke, thus providing for the working of the two pistons or diaphragms simultaneously after the completion of the first stroke, even though they may not both be at the end of their stroke when started.

The invention also consists in the combination, with the foregoing, of a supply-reservoir connected with one of the cylinders or chambers or with the connecting-pipes, and serving to compensate for any leakage by keeping the two cylinders or chambers and their connecting-pipes completely filled with water or liquid.

In the accompanying drawings, Figure 1 represents a longitudinal elevation and partial section of a pumping apparatus embodying my invention and arranged in a mine-shaft; and Fig. 2 represents a transverse section upon the dotted line *x x*, Fig. 1.

Similar letters of reference designate corresponding parts in both figures.

A designates a cylinder, which may be arranged in any suitable place—as, for instance, immediately over the mouth of a mine-shaft, B; and C designates a piston, which is reciprocated by a direct-acting engine, D, of ordinary or any other suitable construction, or by any other mechanism adapted to the situation. The cylinder A is very similar to an ordinary pump-cylinder, but is not provided with any suction or discharge valves.

E designates a cylinder, which is arranged at the bottom of the shaft B, or in any other situation where it is not desirable to place the engine D itself. Upon opposite ends of the cylinder E are single-acting pump-cylinders F, which open into the cylinder E and are closed at their outer ends, as clearly shown. In the cylinder E is a piston, G, to which are connected two pump-plungers, H, and the two plungers and piston may be provided with suitable leather or other packings and be all connected by a bolt, *a*, passing through them and having a nut, *b*, at each end. In the ends of the cylinders F may be placed rubber cushions *b'* for the nuts *b* to strike against. Below the cylinder E is a suction-chamber, I, into which water is drawn through a suction-pipe, *c*, and above it is a discharge-chamber, J, from which water is discharged through a stand-pipe, *d*, which may lead to the top of the shaft

3. Water is drawn from the suction-chamber through valves *e* into the pump-cylinders F, nd from said pump-cylinders is discharged hrough other valves, *f*, into the discharge-hamber J; but none of the water enters the ylinder E.

The combination, with the cylinder E and iston G, of the pump-cylinders F and plun-ers H, I do not here claim, and in lieu of be-ng employed in pumping, the cylinder E and iston G might be employed to do other use-ul work.

K K′ designate two pipes which establish ninterrupted communication between the two nds of the cylinder A and the cylinder E, and hese pipes may extend any reasonable distance nd through circuitous passages where power ould not be practically transmitted by rods r other mechanical devices. If the two cyl-nders A and E are entirely filled with water r other liquid, it will be readily understood hat when the piston C is moving in the di-ection indicated by the arrow the water or liq-id will be forced down the pipe K, moving he piston G and the pump-plunger H in the irection indicated by the arrow, and producing n upward current in the pipe K′, to fill the ylinder A, behind or on the right of the pis-on C. When the piston C is moved toward he right the water will be forced downward n the pipe K′ and upward in the pipe K, mov-ng the piston G and its attached plungers H oward the left. Thus it will be understood hat in whichever direction the piston C is noved the pressure exerted by it is transmit-ed through the columns of water in the pipes K K′, and the piston G is moved simultaneous-y in the opposite direction. By inserting a ining in the cylinder D its power would be ncreased, but the piston E would not then per-orm its whole stroke.

It is desirable that the two pistons C and G hould both move in unison, or commence their troke together, and yet if, when the apparatus s started, the piston C commences its stroke vhile the piston G is at the middle of its stroke, he piston C could only move until the piston G reached the end of its stroke, and the appa-atus would be stopped. To prevent this, and nable both pistons to come to a common start-ng-point, no matter at what point in their troke they are started, I connect the two ends of the cylinder A by two passages, *g*, one of vhich is shown in section, and the flow of liquid rom the ends of the cylinder through the pas-sages is controlled by pass-over valves *h h′*, vhich are weighted or loaded, so that during he ordinary working of the apparatus they will not open. If we suppose that at the first starting of the apparatus the piston C starts rom the position shown in Fig. 1 to move to-ward the right, while the piston G starts at half-stroke, the piston C, as soon as the piston G reaches the end of its cylinder, will create sufficient pressure to open the valve *h*, and thus permit the passage of water around the piston C to the left-hand end of the cylinder A, and allow said piston to complete its stroke. The two pistons C and G will then commence their second stroke from the ends of their respective cylinders and terminate their strokes together.

It is intended to keep the cylinders A and E and the pipes K K′ always full of water; but as there will necessarily be some slight loss by leakage, I provide a reservoir, L, above the cyl-inder A, which communicates with the passages G by pipes *i*, in which are check-valves *i′*, which will open to permit water or other liquid to pass from the reservoir L to the cylinder A, but will not permit liquid to pass from said cylin-der to said reservoir, thus compensating for any leakage.

In deep mines the rods for transmitting mo-tion to pumps in the mine from actuating mech-anism at the surface are often of great length and weight and take up room in the shaft which cannot well be spared. By my inven-tion such ponderous connections are dispensed with and the power transmitted through the water-columns in an economical and effective manner.

If desirable, diaphragms might be substitut-ed for the pistons C G and the chambers in which the diaphragms are arranged connected by the pipes K K′.

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

1. The combination, with two liquid cylin-ders or chambers and pistons or diaphragms therein, of two pipes for establishing free com-munication from the two ends of one cylinder or chamber to the two ends of the other cylin-der or chamber, a motor for reciprocating one piston or diaphragm, and a pump or pumps actuated by the other piston or diaphragm, sub-stantially as and for the purpose specified.

2. The combination, with two liquid cylin-ders or chambers, the two ends of one of which are connected by passages controlled by loaded pass-over valves, and pistons or diaphragms in said cylinders or chambers, of pipes establish-ing a free communication from the two ends of one cylinder or chamber to the two ends of the other cylinder or chamber, and a motor for re-ciprocating one piston or diaphragm, substan-tially as and for the purpose specified.

3. The combination, with two liquid cylin-ders or chambers and two pistons or dia-phragms therein, of pipes for establishing free communication from the two ends of one cyl-inder or chamber to the two ends of the other cylinder or chamber, a liquid-supply reservoir, and a valve or valves which permit the passage of liquid from said reservoir to one of said cyl-inders or chambers, and a motor for recipro-cating one of said pistons or diaphragms, sub-stantially as and for the purpose specified.

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Witnesses:
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