No. 657,458. Patented Sept. 4, 1900.

L. SCHULZ.

ENGINE.

(Application filed Mar. 22, 1900.)

(No Model.)

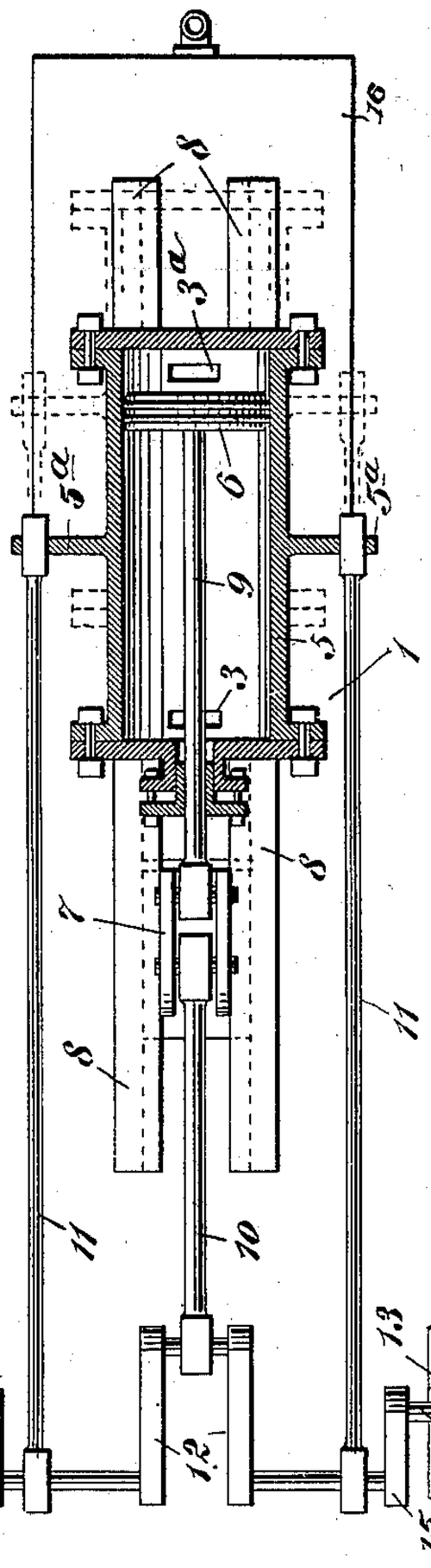

FIG. 1.

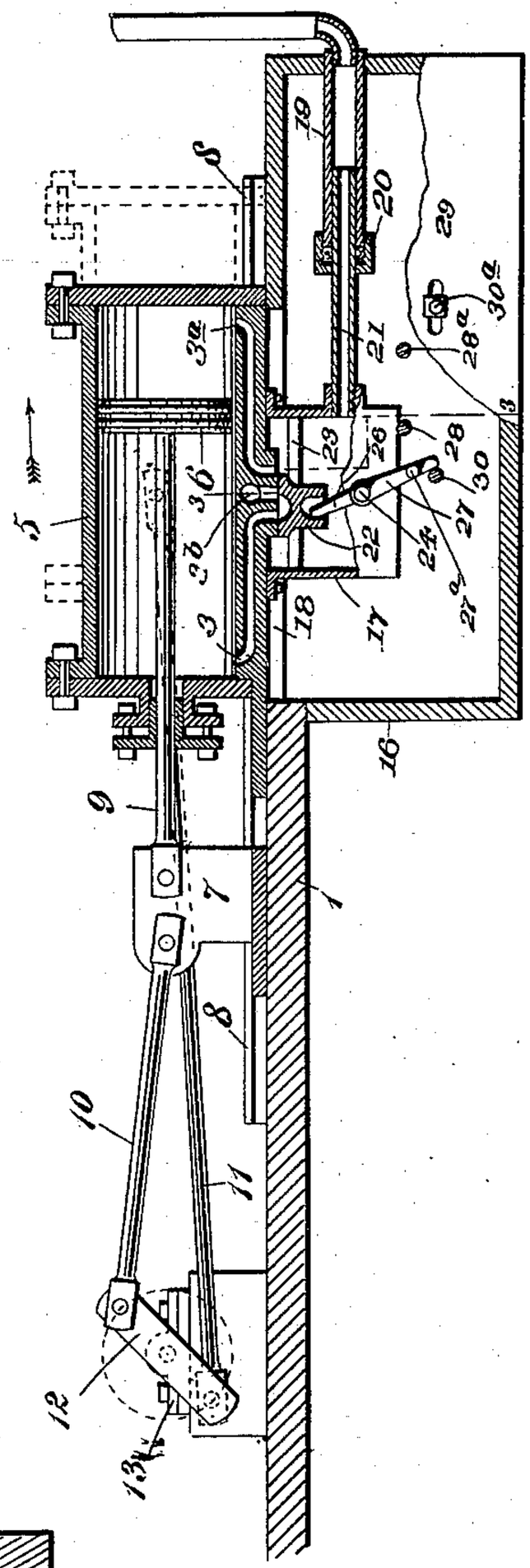

FIG. 2.

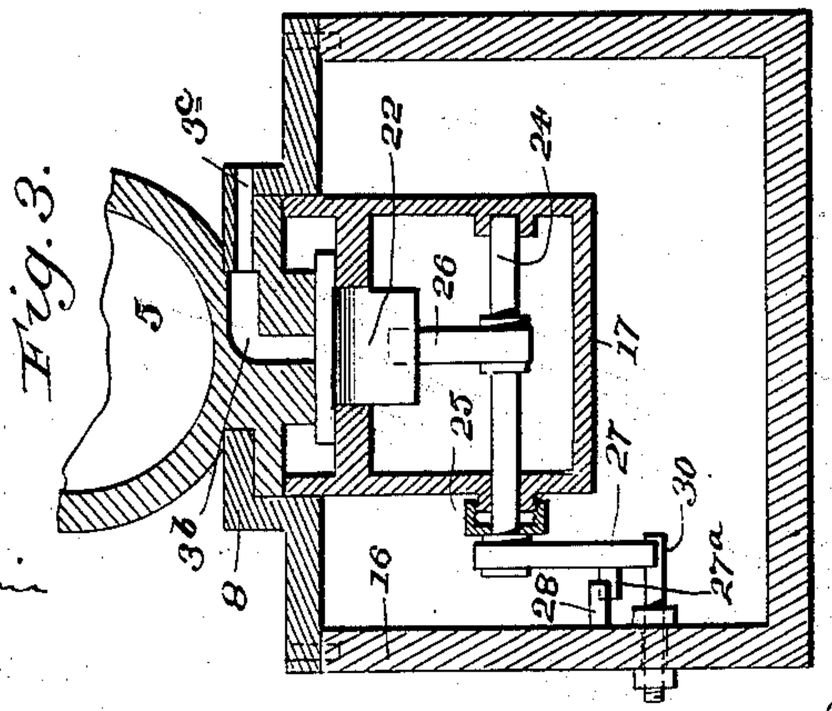

FIG. 3.

WITNESSES

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LOUIS SCHULZ, OF NEW ORLEANS, LOUISIANA, ASSIGNOR OF ONE-THIRD TO HERMAN H. HUTTEN, OF SAME PLACE.

ENGINE.

SPECIFICATION forming part of Letters Patent No. 657,458, dated September 4, 1900.

Application filed March 22, 1900. Serial No. 9,752. (No model.)

To all whom it may concern:

Be it known that I, LOUIS SCHULZ, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented new and useful Improvements in Engines, of which the following is a specification.

My invention relates to improvements in steam and other fluid pressure engines, and contemplates the provision of an improved engine in which the piston and the cylinder containing the same are connected to a common crank-shaft or other element to be driven and are independently movable under the influence of steam or other fluid pressure, this being advantageous because the fluid-pressure is directly applied to the crank-shaft or other element to be driven and all of the pressure of the steam is utilized at each stroke.

Other objects and advantages of the invention will be fully understood from the following description and claims, when taken in conjunction with the accompanying drawings, in which—

Figure 1 is a view, partly in plan and partly in horizontal section, of so much of an engine as is necessary to illustrate my invention. Fig. 2 is a view, partly in side elevation and partly in vertical section, of the same. Fig. 3 is an enlarged detail transverse section taken on the broken line 3 3 of Fig. 2.

In said drawings, similar numerals designate corresponding parts in all views, referring to which—

1 is an engine-bed.

14 is a shaft journaled in suitable bearings 13 and having an inner crank 12 and outer cranks 15 disposed oppositely to the crank 12.

8 8 are longitudinal guides fixed on the bed 1.

7 is a cross-head having a base arranged and adapted to move between the guides.

5 is a piston-cylinder, which also has a base arranged and adapted to move between the guides, and 6 is a piston contained in and adapted to move independent of the cylinder. The rod 9 of the piston extends through a stuffing-box in the inner end of the cylinder and is connected to the cross-head 7, which in turn is connected by a rod 10 with the inner crank 12 of the shaft 14, whereby it will be seen that when the piston is reciprocated a rotary motion will be imparted to the shaft.

As best shown in Fig. 1, the cylinder 5 is provided at opposite points with lateral arms 5^a, which are connected by rods 11 with the outer cranks 15 of the shaft 14, whereby it will be seen that reciprocatory movement of the cylinder will also serve to rotate the said shaft.

It will also be seen from the foregoing that when the piston and cylinder are simultaneously moved in opposite directions they will act in concert through their connections to rotate the crank-shaft.

16 is a casing disposed below the bed 1, as shown in Figs. 2 and 3, and 17 is a valve-chest which is connected to and movable with the cylinder 5 and extends through an elongated opening 18 in bed 1 into the casing 16, as illustrated. The interior of the valve-chest is connected with the interior of the cylinder 5, at opposite ends thereof, by ports or passages 3 3^a, and the interior of the said valve-chest is also connected by an exhaust-port 3^b with a slot 3^c in one of the guides, which slot is in communication with the open air, as best shown in Fig. 3.

19 is a longitudinally-disposed tube fixed in the casing 16 and having its outer end connected with a source of live-steam supply and its inner end equipped with a stuffing-box or packing-gland 20, and 21 is a slidable tube fixedly connected to the valve-chest 17 and telescoped in the tube 19, whereby it will be seen that the movable valve-chest will be continuously supplied with steam.

22 is a slide-valve movable on a guide-rod 23 in chest 17 and designed to control communication between the interior of the chest and the ports 3 3^a and communication between said ports 3 3^a and the exhaust-port 3^b after the ordinary well-known manner, and 24 is a transverse rock-shaft journaled in the chest 17 and extending through a stuffing-box 25, on one side wall thereof, as best shown in Fig. 3. The said shaft is provided within the chest with an upwardly-extending arm 26, arranged in engagement with the valve 22, and is also provided at its outer end with a depending arm 27. This latter is designed to be engaged by the upper tappets 28 28^a, fixedly connected to one side wall 29 of the casing 16, and lower tappets 30 30^a, adjustably connected to said wall 29 after the following manner:

When the cylinder 5 is in the position shown

in Fig. 2, the arm 27 is engaged by the tappet 30 and the valve 22 is moved into the position shown, so as to effect communication between the portion of the cylinder in front of the piston and the exhaust and communication between the valve-chest and the portion of the cylinder in rear of the piston. This obviously results in the cylinder being moved in the direction indicated by the large arrow in Fig. 2 and the piston being moved in the direction opposite to that indicated by arrow. As the cylinder moves in the direction stated the lateral lug 27ª on the arm 27 is engaged by the tappet 28, with the result that the arm 27 is swung into an approximately-perpendicular position and the valve is moved to close both ports 3 3ª, after which the lug 27ª moves under the tappet 28 and the arm 27 remains in its perpendicular position until the arm 27 is engaged by the tappet 30ª. When the arm 27 is engaged by the tappet 30ª, as stated, the valve 22 is moved into a position to effect communication between the interior of the valve-chest and the port 3 and communication between the port 3ª and the exhaust, with the result that the piston is moved in the direction indicated by arrow in Fig. 2 and the cylinder in the direction opposite to that indicated by arrow. When the cylinder is moved in the direction opposite to that indicated by arrow in Fig. 2, the lug 27ª of arm 27 is first engaged by the tappet 28ª to move the arm into a perpendicular position, and said arm 27 is then engaged by the tappet 30, when the operation described is repeated. When it is desired to regulate the throw of the valve, the same may be readily accomplished by adjusting the tappets 30 30ª in the slots of the casing-wall 29.

It follows from the foregoing that the pressure of the steam or other expansible fluid employed is directly and continuously applied to the crank-shaft and the full pressure of the steam is utilized at each stroke, with the result that a high speed can be attained. It will also be observed that the engine is simple and inexpensive in construction and embodies no frail parts, such as are likely to get out of order after a short period of use.

Having thus described my invention, what I claim is—

1. In the fluid-pressure engine described, the combination of the casing, the bed arranged above the casing and having a slot in communication therewith, and also having a guide, and shaft journaled in suitable bearings, and having oppositely-disposed cranks, a cylinder movable on the bed in the guide thereof, a cross-head also movable in the guide, driving connections between the cylinder and cross-head and the cranks of the shaft, a piston arranged in and movable independent of the cylinder, and having a rod connected to the cross-head, a valve-chest movable with the cylinder, and extending through the slot in the bed into the casing; said chest being connected by ports with the interior of the cylinder at the opposite ends thereof, and also connected by an exhaust-port with the atmosphere, suitable means for connecting the valve-chest with a source of fluid-pressure, a slide-valve arranged in the chest, a rock-shaft journaled in the chest, and having an arm within the chest arranged in engagement with the valve and also having an arm without the chest, and the upper and lower tappets contained in the casing, and arranged in the path of and adapted to engage the outer arm of the rock-shaft.

2. In a fluid-pressure engine, the combination of an element to be driven, a cylinder movable toward and from the element to be driven, a piston arranged in and movable independent of the cylinder, driving connections between the cylinder and piston and the element to be driven, a valve-chest movable with the cylinder and connected by ports with the interior of the cylinder at opposite ends thereof and also connected by an exhaust-port with the atmosphere, suitable means for connecting the valve-chest with a source of fluid-pressure supply, a slide-valve arranged in the chest, a rock-shaft journaled in the chest and having an arm within the chest arranged in engagement with the valve and also having an arm without the chest, and the upper tappets and lower tappets arranged in the path of and adapted to engage the outer arm of the rock-shaft, substantially as specified.

3. In a fluid-pressure engine, the combination with an element to be driven, a cylinder movable toward and from the element to be driven, a piston arranged in and movable independent of the cylinder, driving connections between the cylinder and piston and the element to be driven, a valve-chest movable with the cylinder and connected by ports with the interior of the cylinder at opposite ends thereof and also connected by an exhaust-port with the atmosphere, a fixed tube adapted to be connected with a source of fluid-pressure supply, a pipe connected to the valve-chest and telescoped in said fixed tube, a slide-valve arranged in the chest, a rock-shaft journaled in the chest and having an arm within the chest arranged in engagement with the valve and also having an arm without the chest, and the upper tappets and lower tappets arranged in the path of and adapted to engage the outer arm of the rock-shaft, the lower tappets being adjustable, substantially as specified.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LOUIS SCHULZ.

Witnesses:
HERRMANN HUBERT HUTTEN,
WM. H. PASCOE.