

(No Model.)

F. F. LANDIS.

DEVICE FOR COOLING SHAFT BEARINGS.

No. 459,755.

Patented Sept. 22, 1891.

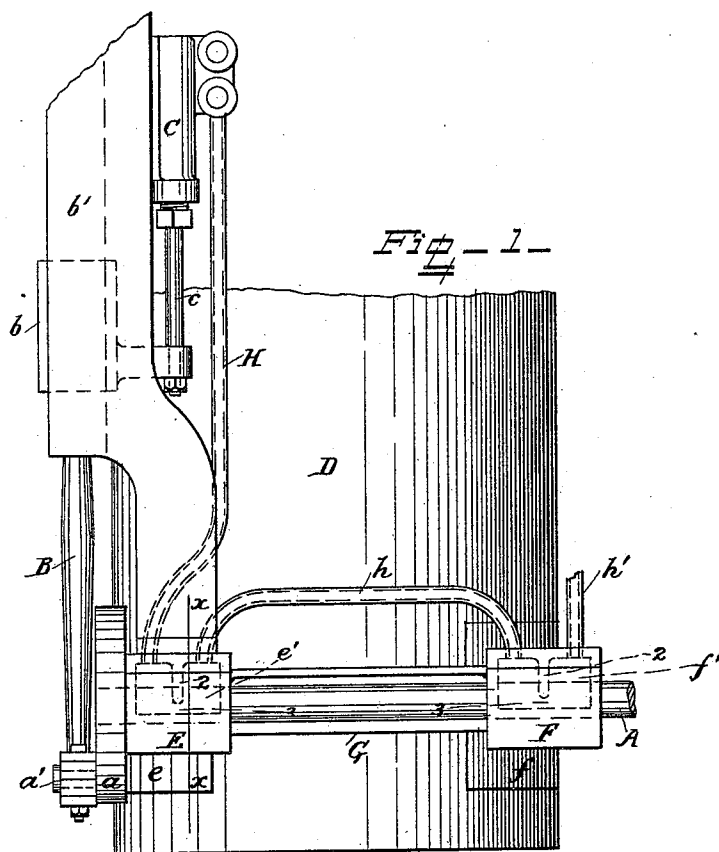
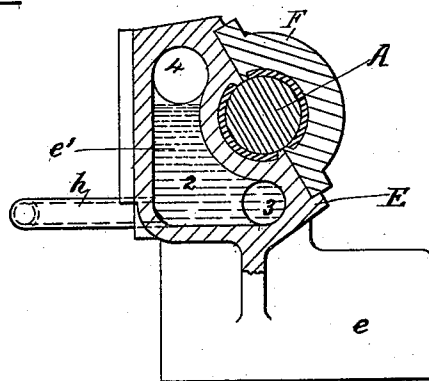


Fig. 2.



WITNESSES

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DEVICE FOR COOLING SHAFT-BEARINGS.

SPECIFICATION forming part of Letters Patent No. 459,755, dated September 22, 1891.

Application filed November 8, 1890. Serial No. 370,797. (No model.)

To all whom it may concern:

Be it known that I, FRANK F. LANDIS, a citizen of the United States, residing at Waynesborough, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Devices for Cooling Shaft-Bearings and Preventing them from Bursting in Frosty Weather; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to steam and other motor engines; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed, whereby the bearings of the crank-shaft or other similar shaft are kept cool while the shaft is revolving and whereby the bearings are prevented from bursting in cold weather.

In the drawings, Figure 1 is a plan view from above of the crank-shaft, pump, and other co-operating parts. Fig. 2 is a cross-section through one of the crank-shaft bearings, taken on the line *xx* in Fig. 1 and drawn to a larger scale.

This invention is specially applicable to traction and portable steam engines which run at a high speed and which are frequently left exposed to frost in winter-time; but it may also be applied to any other motors or machines.

A is the crank-shaft. *a* is the crank-plate, and *a'* is the crank-pin.

B is the connecting-rod. *b* is the cross-head, and *b'* is a portion of the engine-frame to which the cross-head guides are secured.

C is the pump, secured to the frame and provided with the plunger *c*, which may be worked direct from the engine cross-head or from an eccentric on the crank-shaft. The pump is provided with the ordinary suction and delivery valves.

D is the boiler-top or other base, upon which the engine is supported.

All the above-mentioned parts may be of any approved form and construction.

E is the main bearing for the crank-shaft, close to the crank-plate, and F is the outer bearing, preferably connected to the bearing E by the connecting-web G. Both bearings are provided with Babbitt-metal liners and

caps in the usual manner. The bearing E is provided with a flange *e*, and the bearing F is provided with a flange *f*, and the said flanges are secured to the boiler-top D, which forms the base of the engine. The main bearing E is provided with an internal chamber *e'*, partially surrounding the shaft, and the lower part of this chamber is divided by a transverse vertical partition 2, having an open passage 3 past that end of it next to the bearing and an open passage 4 above it. The outer bearing F is provided with a similar internal chamber *f'*, a partition 2, and open passages 3 and 4.

The delivery-pipe H from the pump is secured to the bearing E and forces the water into the chamber *e'*, around the partition, and through the pipe *h*, which connects the internal chambers of the two bearings E and F together. The water which is forced through the pipe *h* by the pump passes around the partition and out of the pipe *h'*, which is connected to the feed-water heater or to the boiler direct, or otherwise, as desirable. The pump commences to pump water directly the engine is started, and the water which is forced through the hollow chambers in the crank-shaft bearings keeps them perfectly cool, no matter how fast the shaft may revolve. The pipes H, *h*, and *h'* are connected to the lower parts of the chambers *e'* and *f'*, so that the upper parts of the chambers always contain a certain amount of air, which is compressed into a comparatively small volume while the engine is at work. The chambers *e'* and *f'* constitute the air-vessel of the pump and cause it to force the water in a regular stream.

The object of the partition and the passage 3 is to obstruct the direct flow of water through the chamber and cause the cool water to impinge against the metal of the casting as close to the bearing as possible. The passage 4 keeps the air at equal pressure on each side of the partition. When the engine stops and the boiler cools down, the ordinary check-valve of the boiler is relieved from the pressure of the steam. This valve opens of itself and allows the pressure in the pump and its air-vessel and delivery-pipes to fall. The compressed air expands in the upper parts of the hollow chambers and drives most

of the water out of them, so that if the remaining water freezes it will have plenty of room to expand and will not burst the castings of which the bearings are formed. The
5 bearings are kept perfectly cool by the water, and other similar bearings may be constructed and connected with the pipe *h'*, if desired.

What I claim is—

- 10 1. The combination, with a shaft, of a bearing for the shaft, provided with a hollow chamber having an outlet at its lower part, and a force-pump operatively connected with the shaft and provided with a delivery-pipe lead-
15 ing into the lower part of the said chamber, whereby the said bearing may be kept cool and the said chamber, which forms the air-vessel of the pump, may be prevented from bursting in cold weather.
- 20 2. The combination, with a shaft, of a main bearing provided with a hollow chamber, a force-pump provided with a delivery-pipe connected to the lower part of the said chamber, an out end bearing for the said shaft, also

provided with a hollow chamber and an out- 25
let at the lower part thereof, and a pipe connecting the lower parts of the two said hollow chambers, substantially as and for the purpose set forth.

3. The combination, with a shaft, of a bear- 30
ing for the shaft, provided with a hollow chamber having inlet and outlet openings at its lower part, and a transverse partition provided with an air-passage at its upper part and a water-passage at its lower part next to the 35
said bearing, whereby the water forced through the chamber may be brought in contact with that portion of it next the shaft and the upper part of the chamber may contain air, substantially as and for the purpose set 40
forth.

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

FRANK F. LANDIS.

Witnesses:

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