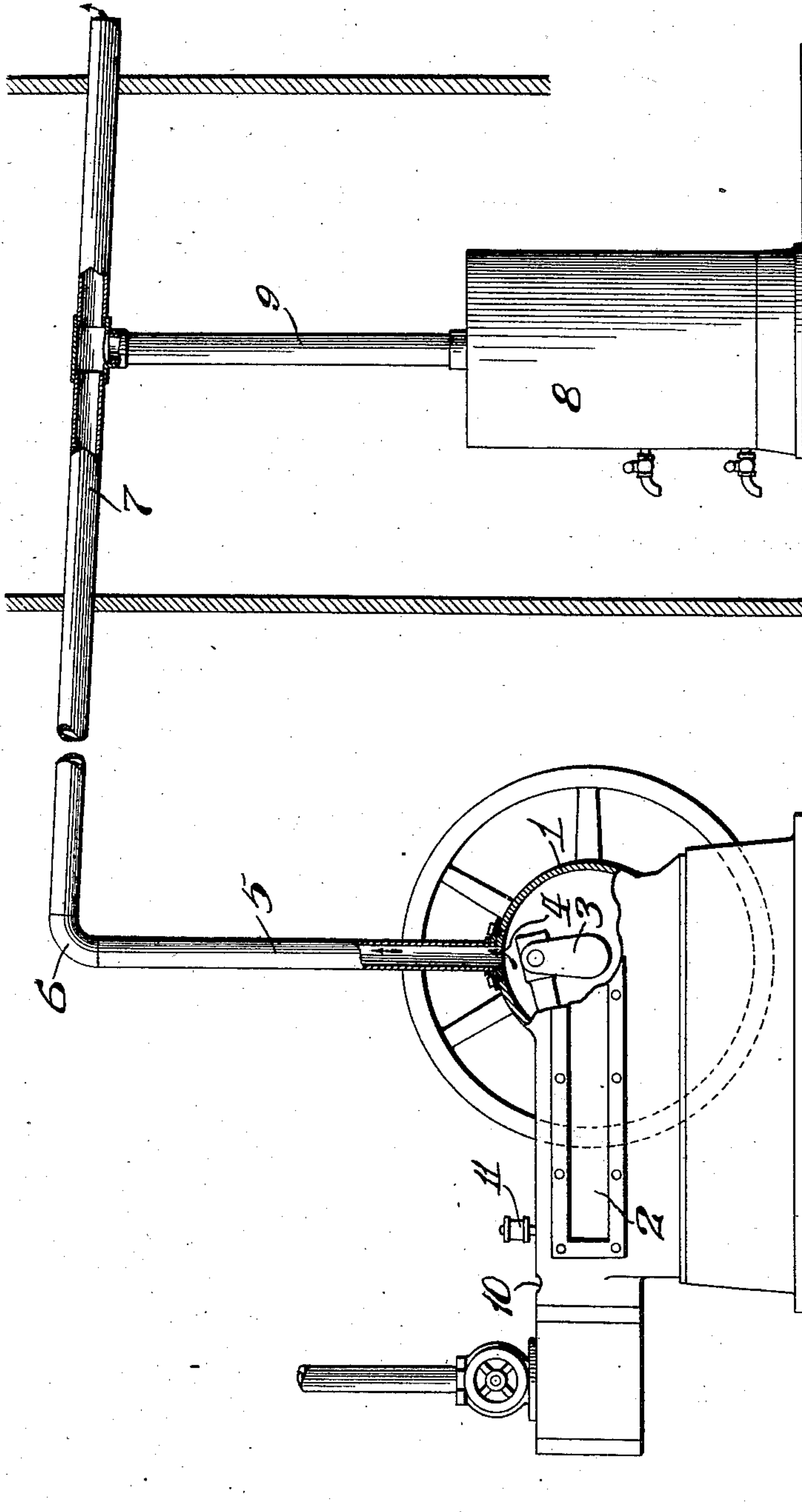


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 COOLING ATTACHMENT FOR STEAM ENGINE CRANK CASES.  
 APPLICATION FILED MAY 26, 1910.

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Patented Apr. 4, 1911.



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# UNITED STATES PATENT OFFICE.

FRANK B. NORTHROP, OF ST. LOUIS, MISSOURI.

COOLING ATTACHMENT FOR STEAM-ENGINE CRANK-CASES.

988,493.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed May 26, 1910. Serial No. 563,476.

*To all whom it may concern:*

Be it known that I, FRANK B. NORTHROP, a citizen of the United States, and resident of St. Louis, Missouri, have invented certain new and useful Improvements in Cooling Attachments for Steam-Engine Crank-Cases, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to an improved atmospheric cooling-attachment for steam-engine crank-cases, and consists in the novel construction and combination of parts hereinafter described and pointed out in the claims.

The object of my invention is to provide an air-circulating cooling-attachment for closed crank-cases of steam engines, which shall largely prevent the saponification of the lubricating-oil contained in said crank-cases, and thereby render the oil more efficient than it would be without the use of my cooling-attachment.

A further object is to separate the moisture from the oil after it has been used, so that it may be again used efficiently.

A further object is to prevent saponification of the oil in the crank-case in order that an oil of cheaper grade and lower viscosity and lower fire-test may be used with the same efficiency as that of a higher-grade of oil.

A further object is to provide means which shall filter and purify the oil discharged by the cooling-attachment.

The annexed drawing is a sectional side-elevation of a closed crank-case steam engine, having my invention applied thereto.

The closed crank case of the ordinary steam-engine is indicated by the numeral 1, the same being fitted with the usual removable side-plate 2, for affording access to the interior of said crank-case.

Formed in the crankcase 1 preferably at a point directly above the crank 3 is an opening 4 to which the lower end of a vertical air draft-pipe, or cooling-chamber, 5 is fitted in any suitable manner, a flange on the lower end of said pipe being bolted to said crank-case in the present construction, although it is evident that any known means may be used for attaching said pipe to the crank-case. I have found it necessary to extend said draft-pipe 5 to a height of at least six (6) feet above the point of its at-

tachment to said crank-case, in order that a sufficient natural draft will take place within said pipe to draw out of the crank-case the hot air and vapor which is formed therein by the heat of the engine and friction of the parts with each other and with the oil in the said crank-case. Said draft-pipe 5 is fitted with an elbow 6 at its upper end, and from this elbow there extends a condensing-section 7, which is preferably inclined a little downwardly from said elbow, in order that the condensed water and oil from said condensing-section may flow into a common oil-filter 8 through a vertical pipe 9. The said condensing-section 7 is preferably extended on past the said vertical pipe 9, so that its free end may open into the cold outer air, or into a room separate from the engine-room. Of course, if desired, the filter 8 need not be used at all, in which case the condensing-section 7 may be shorter in length than here shown.

Air from the engine-room enters the crank-case through a suitable opening 10 which is usually found in the upper part of the crank-case, and air also enters through any leaking joint in the parts of the crank-case, such as those between the side-plate 2 and the crank-case, or even through the ordinary lubricator 11.

The operation is as follows: What is known as "splash" lubrication is ordinarily used in the operation of closed-crank-case engines, and the rapid movement of the crank and other parts within said crank-case "churns" the oil to more or less saponification, in ordinary engines; but in an engine fitted with my cooling-attachment there is a constant draft of air and moisture upwardly through the draft-pipe 5, drawing the hot-air moisture, entrained oil and water, toward said draft-pipe, and a portion of each actually enters the said draft-pipe and passes upward into the condensing-section. Some condensing is of course accomplished within the vertical draft-pipe, and the condensation runs back into the crank-case, but most of the condensation takes place within the inclined condensing-section 7, from whence the condensed water and oil gravitates into the vertical pipe 9 and to the filter 8, from which latter the filtered-oil may be removed as usual. The free end of the condensing-section should open into a cool room, or out of doors, as I have found that more or less cold air finds its way into said condens-



ing-section, and even into the draft-pipe (if the draft therein is not too strong) and assists in condensing the hot vapors of the crank-case.

5 Circulation of air within the crank-case by means of my cooling-attachment, as described, enables me to make use of a cheaper grade of oil without injurious saponification taking place, and the oil may be of a lower  
10 viscosity.

Any common means, such as a fan or other common device, may be connected with the draft-pipe, or with the horizontal section 7, for the purpose of creating a draft  
15 therein.

What I claim is:

1. A cooling-attachment for engine crank-cases, comprising an atmospheric draft-pipe

connected to the upper part of the air-space of the crank-case, and a downwardly-inclined condensing section open to the external-air and connected at one end to said draft-pipe.

2. The combination, with an engine crank-case, of a vertical draft-pipe, an inclined  
25 condensing-section of pipe connected to the said draft-pipe, and a suitable oil-filter connected to receive oil and water from said inclined condensing-section of pipe.

In testimony whereof, I have signed my  
30 name to this specification, in presence of two subscribing witnesses.

FRANK B. NORTHROP.

Witnesses:

E. E. LONGAN,

E. L. WALLACE.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."

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