

April 26, 1938.

S. J. BURRIS
 APPARATUS FOR REMOVING SCALE FROM WATER
 JACKETS OF INTERNAL COMBUSTION ENGINES
 Filed July 25, 1936

2,115,193

Fig. 1.

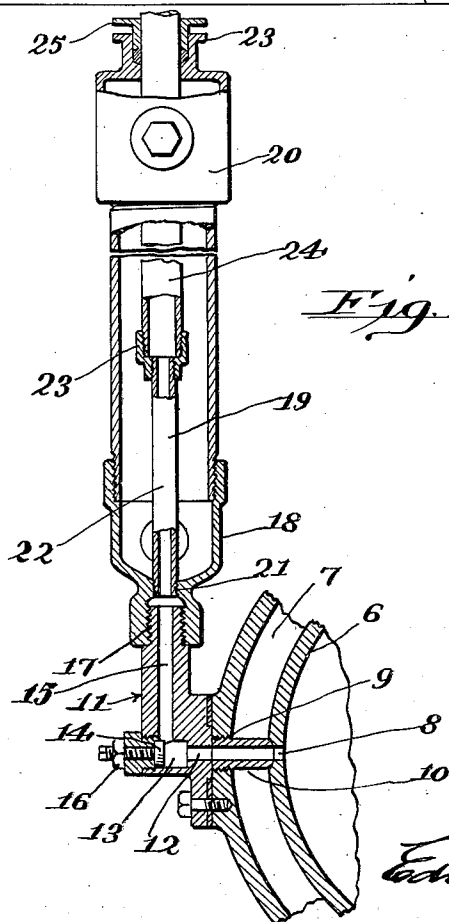
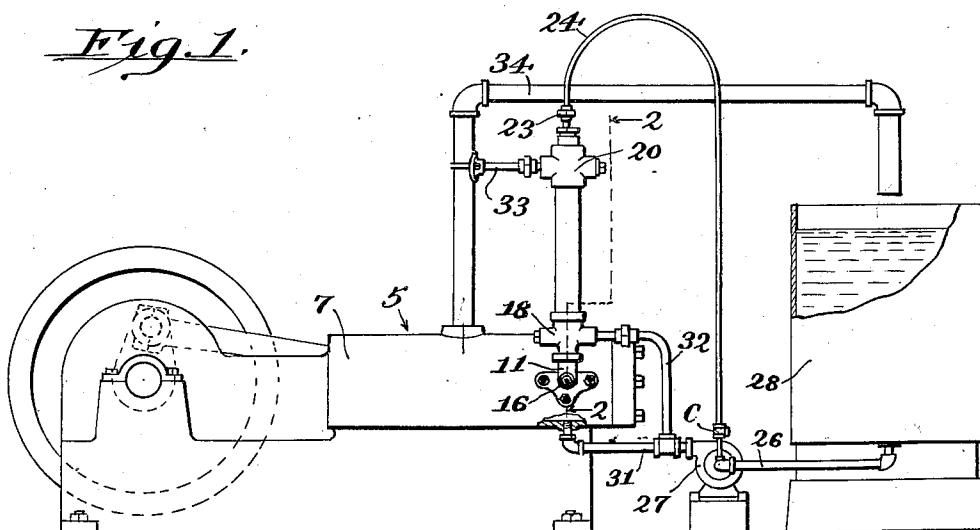
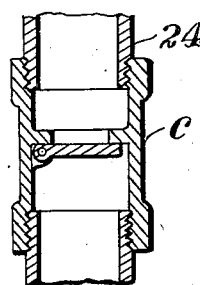


Fig. 2.

Fig. 3.



Inventor:
S. J. Burris.

Edmund A. Mause,
Attorney.

UNITED STATES PATENT OFFICE

2,115,193

APPARATUS FOR REMOVING SCALE FROM
WATER JACKETS OF INTERNAL COMBUSTION ENGINES

Sylvester J. Burris, Montebello, Calif.

Application July 25, 1936, Serial No. 92,698

1 Claim. (Cl. 123—173)

This invention relates more specifically to an apparatus for preventing the formation of scale on the walls of the water jackets of internal combustion engines.

5 Chemical analysis of water employed to cool the cylinders of explosive engines during their operation do not contain a sufficient quantity of chemicals that will hold the scale formation elements in solution especially when the cooling
10 water becomes unduly hot.

It is therefore an important object of this invention to co-mingle with the cooling water a percentage of the exhaust gases of the engine before its introduction into the water jackets of
15 the engine, whereby to chemicalize the water to remove the scale from the water jacket walls, and to prevent its formation.

A further object is to provide an apparatus adapted to be connected with the explosion or compression chambers and water circulating systems of internal combustion engines in such a
20 manner that a portion of the ignited charge will be co-mingled with the cooling water during each power stroke of the engine before the water is introduced into the engine jackets.

Further objects and advantages will be apparent from the following description reference being had to the accompanying drawing, in which,

30 Fig. 1 is a side elevation of an internal combustion engine, showing my apparatus applied thereto.

Fig. 2 is a central vertical section of the jacketed gas admission means taken on line 2—2 of Figure 1.

Fig. 3 is a detail vertical section taken through the check valve.

Referring now more particularly to the accompanying drawing 5 indicates a general type of an internal combustion engine of the stationary type commonly employed in manufacturing and oil field operations. Engine 5 consists of a cylinder
40 6, water jacket 7, and other usual and common mechanical elements whose description is not thought necessary.

Cylinder 6 is provided on one side with a bore 8 and the jacket wall with a threaded opening 9, a short nipple 10 threadingly engaging the jacket opening 9 and its inner end seating in the cylinder wall, the bore 8 of the nipple being in alignment with the cylinder bore. Bolted or otherwise secured to the wall of the engine jacket 8, is a vertically disposed gas distributing member 11,
50 provided with a horizontal bore 12 in alignment with the nipple bore 8, for discharging the ex-

haust gases from the engine cylinder into an enlarged chamber 13 in the bottom of member 11. This chamber is provided with a screw operated valve 14 that serves to control the volume
5 of gas from the engine cylinder into the vertical bore 15 of the gas distributing element 11, a nut 16 maintaining the valve in an adjusted position. The upper end 17 of element 11 is externally threaded for the reception of a fitting 18, its upper portion being enlarged and having an internally threaded end into which is screwed the
10 lower end of a tubular pipe 19 that forms a water jacket, its upper end engaging a cross fitting 20. Secured in the bottom opening 21 of fitting 18 is a vertically disposed gas discharge tube 22, its upper end
15 having a reducing coupling 23 threadingly secured thereto. Mounted in the enlarged end of coupling 23 is a tube 24 of larger diameter than gas tube 22, in order to provide for expansion of the engine exhaust gases. Tube 24 passes
20 through fitting 20 and packing gland 25, being bent downwardly, its lower end being connected to the fluid intake line 26 of a centrifugal pump 27 or the like. Line 26 is connected to a fluid cooling tank 28 at the bottom thereof. Interposed in the burned gas line 24 adjacent the pump
25 27 is a check valve C of usual form, for preventing the cooling water from entering the gas line on the operation of the circulatory system.

Connected to the pump discharge outlet is a
30 pipe line 31 for delivering the cooling water to the engine jacket as shown in Fig. 1, said line being provided with a by-pass line 32 for delivering cooling water to the water jacket of the gas line, the heated water from this jacket being discharged through a by-pass pipe line 33 into the
35 main water discharge pipe line 34 connected to the engine jacket, its free discharge end being disposed above the water cooling tank 28, as clearly shown in the drawing.

By water jacketing the exhaust pipe line 19, the hot gases passing therethrough will not only be reduced in temperature but when they are discharged into the water intake line the cooled
40 gases (carbon monoxide) will be immediately condensed to form carbonic acid, which when mingled with the intake cooling water will hold the magnesium and calcium salts in solution, such chemicals forming a solution that acts efficiently to remove and prevent the formation of
45 scale.

From the above description the operation of the apparatus will be clear. When the engine is operated the exhaust gases from the engine cylinder pass upwardly through the gas pipe line 19
55

and thence downwardly through the check valve C into the intake line 26 of the pump where it is co-mingled with the cooling water before entering the engine jacket.

5 I claim:

The combination with an engine having a water circulating system comprising a water jacketed cylinder, a water tank, a water inlet pipe leading from the lower portion of the tank to the lower 10 portion of the water jacket, a water circulating pump mounted in the water intake line, a water outlet pipe leading from the upper portion of the water jacket to the upper portion of the tank, the cylinder provided on one side with a bore 15 and the jacket wall with a threaded bore, a nipple engaging the jacket bore and seating in the bore formed in the cylinder, a vertically disposed ex-

haust gas distributing member having a vertical bore secured to the wall of the engine jacket having a horizontal bore in alinement with said nipple bore, the juncture of the vertical and horizontal bores of the distributing member being enlarged to form gas chamber, a valve means secured to the outer wall of the gas chamber for controlling the volume gas from the engine cylinder to the distributing member, a gas discharge 10 pipe connected to the upper end of the gas distributing member, its free end being connected to the water inlet end of the circulating pump, whereby the exhaust gases will be co-mingled with the water and chemicalize the same before its 15 entry into engine water jacket.

S. J. BURRIS,