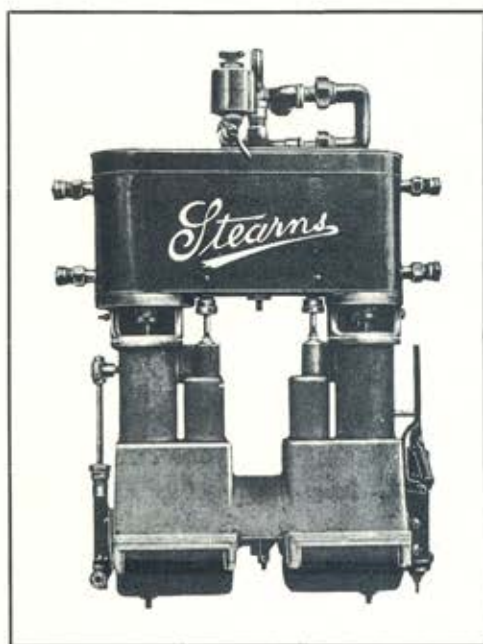


# STEARNS COMPOUND ENGINE.

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SHOWING WATER PUMP AND AIR PUMP ATTACHED TO CROSS HEADS.

Stearns Steam Carriage Co.  
Syracuse, N. Y.

# Stearns Compound Engine



**T**HIS ENGINE not only dispenses with all the features which have gained for the ordinary automobile engine the characterization of a toy, but comprises some very ingenious features by which the usual complication of a combined compound and also simple reversing engine has been greatly reduced.

The general features of the engine may be briefly enumerated as follows: It is an upright, two-cylinder, double-acting, compound engine, with piston valves, plain bearings, inclosed crank and eccentrics, single eccentrics and a combined reversing and compound-simple transforming valve.

The upper part of the engine, or the cylinder casting, has five parallel, cylindrical chambers, which may be designated as follows (starting from the left): High pressure cylinder, high pressure valve chest, control valve chest, low pressure valve chest and low pressure cylinder.

The two cylinders, their pistons and valves are of usual forms of construction, the valves being of the piston type, hollow, and therefore balanced; both ends of both cylinders with the automatic relief cocks customary with this type of valve. Inserts or liners are placed in the valve chest to increase the accuracy of the parts and to permit of new liners being fitted when the old ones are worn.

The control valve is in a way a double of the ordinary piston valve. It is open from end to end, and is therefore balanced; it has the usual annular exhaust recess on its outer surface, and in addition an internal port extending clear around, and adapted to bring into communication various passages leading from the control valve chest to the high and low pressure valve chest and to the exhaust ports thereof.

The steam pipe from the boiler leads into the control valve chamber.

Steam is admitted to the control valve chamber by means of a throttle valve and lever, the lever being placed conveniently for the operator.

The position of the control valve as shown in the drawing is, just above the ports, to cut off steam from the steam chests. Were this control valve lowered so the top of the control valve would be even with the bottom port on the high pressure cylinder side, the engine would run compound, forward speed. The live steam now passes from the control valve chest, through the port just cleared by the upper edge of the control valve, to the high pressure steam chest, and is distributed by the high pressure valve alternating to opposite ends of the cylinder.

The high pressure valve is shown in a position where the lower end of the high pressure cylinder exhausts. The path of the steam leaving this end of the cylinder can easily be followed in the drawing.

The steam flows through the exhaust passage of the high pressure valve, through a passage leading from there to the control valve chest, through the internal port of the control valve and through a passage leading from the control valve chest to the low pressure valve chest, which passage is shown in the drawing in full communication with the internal port of the control valve.

The low pressure valve distributes the steam alternately to the two ends of the low pressure cylinder; as the high pressure piston is shown at half stroke and as the two cranks are set at 90 degrees, the low pressure piston is in its extreme inner position and the lower end of the cylinder is just beginning to exhaust.

The steam flows through the port to the exhaust chamber surrounding the low pressure valve, and from there through a passage to the exhaust chamber surrounding the control valve, from which latter it is led to the atmosphere or to a muffler.

By raising the control valve until the passage shown in the drawing as connecting the exhaust port of the high pressure cylinder with the internal port of the control valve is uncovered by the latter valve, the functions of the exhaust and admission ports are reversed, and the engine runs in a reverse direction. When the control valve is lowered until it uncovers the passage shown in the drawing, as connecting the internal port of the control valve with the low pressure valve chest, live steam will flow to both valve chests and the engine will then work as a simple engine, which will provide the increased power that may be required in an emergency.

By slightly varying the position of the control valve the steam may also be throttled with this manner of working the engine. When the control valve is in this position the exhaust ports of both the high and low pressure cylinder are in communication with the central exhaust port, and both cylinders exhaust therefore to atmosphere.

This engine develops  $2\frac{3}{4}$  horse power when running compound, and the power is doubled when running simple.

The cylinders are: High pressure, 2 inch diam. by  $3\frac{1}{2}$  inch stroke; the low pressure, 3 inch diam. by  $3\frac{1}{2}$  stroke.

**Weight, complete with Pumps, 110 lbs. Price, \$150.00.**



