

Essex 4 Water Inlet Deflector

The Water Inlet Deflector is THE critical part which is key to the successful operation, and effectiveness of the Thermo-Siphon cooling system employed in the 1918-23 Essex F Head 4 engine. Many owners are not aware of this part's existence due to its hidden location.

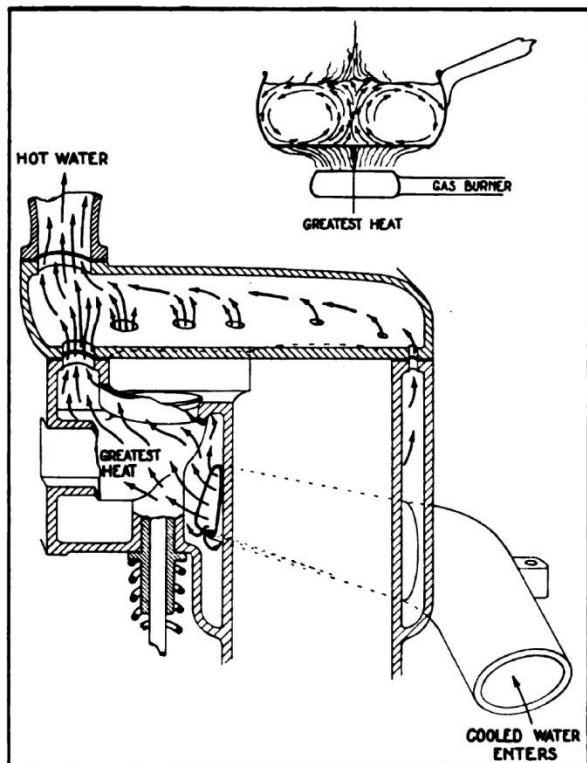
The Water Inlet Deflector is located behind the Water Inlet Elbow on the left side of the engine. Its purpose is to guide the coolant flowing from the radiator between cylinders 2 & 3, then direct it to the hottest areas of the engine block around the exhaust valve pockets first, before spreading around to the other areas of the water jacket, and up through the head. The following article from the May 16, 1921 issue of "The Hudson Triangle" dealer newsletter is one of the very few pieces of surviving literature that shows the Water Inlet Deflector, and illustrates the coolant flow.

THE HUDSON TRIANGLE

The Essex Cooling System is Patented

FEW cars enjoy the distinction of a patented cooling system. Yet, the engineering principles on which the Essex is founded might be expected to include a feature of this kind.

The basic principle is the "thermo-syphon," which in this case means the automatic movement of the cooling fluid due to its temperature. Most people are aware of the fact that hot water rises because it is lighter than cold water. The boiling of water in a pan is the best demonstration of this principle. Only the more observant have noted that it rises—or circulates—more rapidly where the heat is greatest. Note the illustration.



In an engine the greatest heat is found at the point where the heat is not used up, that is, the exhaust side of the combustion chamber and the exhaust valve pocket. So the water will boil more easily and consequently circulate faster at these points. On the opposite side of the jacket some of the heat is used up by the working stroke of the engine, and the incoming cool mixture also helps to keep down the temperature generally. So the water will not move as fast on that side.

Remembering this fundamental principle, it is apparent that if the jacket were open—like the pan of water—the circulation would be a turmoil until the entire body of water above the cylinder was hot enough to rise upward and boil over as in the pan of water; then the exhaust side would be too hot.

In the Essex patent design you will note that the flow is restricted so as to hold back the water until it can heat up sufficiently to cause it to rise to the head, but the holes vary in size. Thus—at the cool side—the holes which are small prevent the flow upward until the water is at the same temperature as on the hot side. On the hot side the holes are larger in proportion to the greater heat transmitted to the water. So the rate of flow upward is the same all over the cylinder head, but the amount flowing is varied according to local requirements.

The outlet pipe is directly above each point of maximum flow, so that the circulation will be in one direction only, with no turmoil or back-circulation within the cylinder jacket itself. In this way the water can be made to circulate just as fast as could be accomplished with a pump—as soon as it warms up.

The efficiency of this system lies in the fact that the engine cooling water does not circulate until it heats—consequently there is practically no waste of time in heating up to efficiency temperature. Secondly—when warmed up, the entire cylinder head is kept at the maximum temperature—with no hot spots to cause trouble.

This patented system, coupled with the shutters on the radiator, makes it possible to get maximum power and economy. The elimination of the pump, pump drive, stuffing boxes, etc., is an economy in the upkeep of the car—less parts, less trouble. The unrivalled reliability performances of the Essex engine on such long distance endurance trials as the 50-Hour Cincinnati Record and the Transcontinental Records is an endorsement of the perfection of this patented cooling system.

It is imperative that all Essex 4 owners check the condition, or even if the Water Inlet Deflector still exists, before continuing to run their car!

This part was originally made of thin mild sheet steel, and over the last 90 or so years has most likely deteriorated, or rotted away.

WARNING: RUNNING AN ESSEX 4 ENGINE WITHOUT A PROPERLY FUNCTIONING WATER INLET DEFLECTOR TO DIRECT THE COOLANT FLOW, WILL CAUSE CATASTROPHIC CRACKING OF THE WATER JACKET ON THE VALVE SIDE OF THE BLOCK!

The right half of the following picture shows the remains of the original Water Inlet Deflector that was in my 1920 Essex when I first purchased it in 2007. To the left is the new part that I fabricated out of 22ga. stainless steel to replace it.



Included with this bulletin is a detailed measured drawing provided by John Meadows of Victoria, Australia. He created this drawing using an original NOS Essex 4 Water Inlet Deflector. I used this drawing, & measurements to fabricate the stainless steel replacement you see in the above picture, and am successfully running in my car today.

If you have any questions, or need any further assistance, feel free to contact me:

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