Sept. 28, 1965

F. B. OTTOFY
CONTROLLED HEAT INJECTION FOR
INTERNAL COMBUSTION MOTORS

3,208,441

Filed Aug. 19, 1963

2 Sheets-Sheet 1

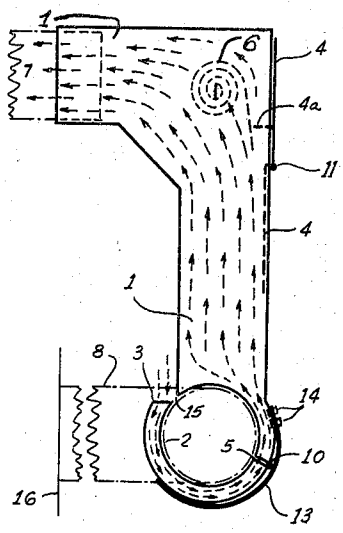


FIG. 1

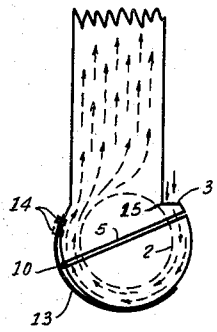


FIG. 2

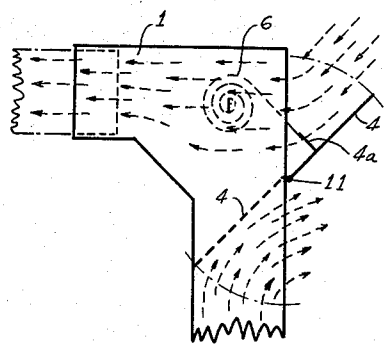


FIG. 3

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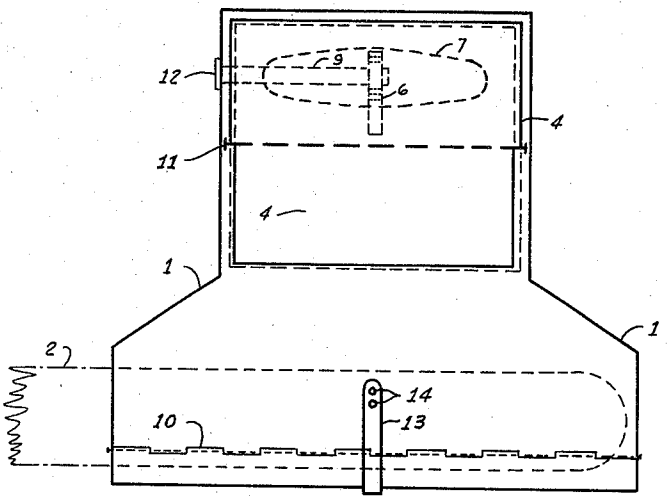


FIG. 4

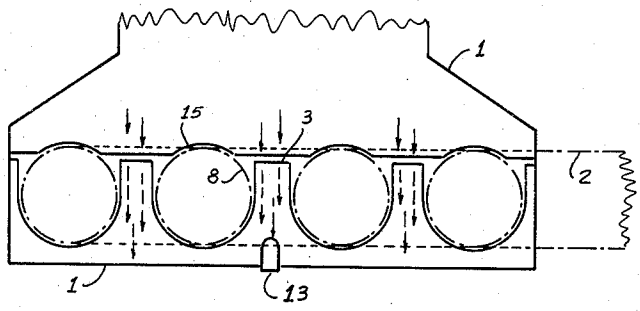


FIG. 5

INVENTOR.

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United States Patent Office 3,208,441 Patented Sept. 28, 1965

3,208,441

CONTROLLED HEAT INJECTION FOR INTERNAL COMBUSTION MOTORS

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Filed Aug. 19, 1963, Ser. No. 302,839
1 Claim. (Cl. 123—122)

My invention relates to heating the air used to mix with gasoline, coal oil or any other agent used to power an internal combustion engine.

The object of my invention is to supply controlled heated air to mix with the power agent, thereby injecting a controlled heated mixture into the combustion chamber. A properly heated mixture will completely fire eliminating the expulsion of unburnt gas out of the exhaust pipe into the atmosphere creating smog. Controlled heat also eliminates the deposit of carbon in the combustion chamber for oil in the mixture is not burnt as takes place in firing a cold mixture, 140° F. is a perfect temperature for the mixture to enter the combustion chamber.

A further object of my invention is to provide an enclosure over the exhaust pipe, taking the air into this enclosure so arranged that air must pass completely around the exhaust pipe for maximum heat extraction. This enclosure has an opening to be connected to the carburetor or mixing device. A two way by-pass shutter is used, this shutter is controlled by a thermostatic bimetal coil to open at 140° F. or any predetermined temperature. This two way shutter admits the heat from the exhaust pipe, also the outside air, thereby controlling the heated air fed to the carburetor.

With the above and other objects in view, the invention consists in the novel features of construction, arrangement and combination of parts hereinafter more fully described and finally pointed out in the claim hereto appended.

Referring to the drawing:

FIG. 1 is a side elevation showing the enclosure over an exhaust pipe.

FIG. 2 is a view of the enclosure from the air flow end showing this end of the enclosure completely closed.

FIG. 3 is side elevation view same as FIG. 1 showing two way shutter at open position.

FIG. 4 is front view, looking into the two way by-pass shutter.

FIG. 5 is a rear view, showing exhaust pipes from cylinder block, also point at which air enters controlled heat injector.

Referring to the drawing: **1** designates the enclosure, **2** designates any exhaust pipe for an internal combustion engine, **3** designates air intake to enclosure, **4** desingates two way by-pass shutter, **4***a* designates opening arm, used to open this shutter, **5** point at which enclosure opens to allow attachment and detachment over exhaust pipe, **6** thermostatic bimetal coil, **7** intake to air filter or carburetor, **8** exhaust pipe from cylinder block, **9** bracket used to hold thermostatic bimetal coil in place, **10** hinge used to allow bottom section to open, **11** socket used to carry end of rod carrying by-pass shutter, **12** plate used to hold bracket for carrying thermostatic bimetal coil against side of device, **13** spring clip, used to hold top and bottom section up against exhaust pipe, **14** rivets used to hold spring clip against top of enclosure, **15** point at which device rests on exhaust pipe, **16** cylinder block.

FIG. 1 is a side view of my invention. **1** designates main section of controlled heat injector, **2** designates exhaust pipe showing same completely enclosed, **3** designates point at which air enters enclosure, **4** designates controlled by-pass shutter, **4***a* designates arm against which thermostatic bimetal coil presses to open shutter, **5** designates opening to allow device to open for attaching over exhaust pipe, **6** designates thermostatic bimetal coil, **7** designates opening to carburetor or mixing device, **8** designates exhaust pipes from cylinder block to main line exhaust pipe, **10** designates hinge holding section of controlled heat injector that encloses exhaust pipe, **11** designates socket used to carry end of rod carrying by-pass shutter, **13** spring clip, used to hold bottom section up against exhaust pipe, **14** rivets used to hold spring against upper portion of controlled heat injector, **15** designates location on exhaust pipe at which device rests from front to rear, **16** designates cylinder block.

FIG. 2 is looking at this device from opposite end, opposed to FIG. 1, this view shows end completely closed in front of exhaust pipe. **2** designates exhaust pipe, **3** opening at which air enters, arrows designate air flow, **5** designates opening to allow lower portion to go over exhaust pipe, **10** designates hinge between upper and lower portion of device, **13** designates spring clip to hold up lower section against exhaust pipe. **14** designates rivets holding spring clip in place.

FIG. 3 is top cutaway of FIG. 1, this view shows two way by-pass shutter at open position, this takes place when the temperature is entering the carburetor at 140° F. **1** designates main section of controlled heat injector, **4** designates by-pass shutter, **4***a* designates opening arm, against which thermostatic bimetal coil has extended and opened shutter, **6** designates thermostatic bimetal coil, **11** designates socket used to carry end of rod carrying by-pass shutter.

FIG. 4 is front view of controlled heat injector. **1** designates main section of injector, **2** designates exhaust pipe, **4** designates by-pass shutter, **6** designates thermostatic bimetal coil, **9** designates bracket used to hold coil in place, **10** designates hinge between upper and lower sections of device, **11** designates socket used to carry end of rod carrying by-pass shutter, **12** designates bracket used to hold thermostatic bimetal coil bracket to side of device, **13** designates spring clip used to hold up lower section of device against exhaust pipe, **14** designates rivets used to hold spring clip against main body of injector.

FIG. 5 is a view of controlled heat injector looking from the motor block toward the device. **1** designates main section of injector, **2** designates the exhaust pipe, **3** designates opening at which air enters, **8** designates exhaust pipe, **13** designates spring clip, **15** designates point at which device rests on exhaust pipe.

As here illustrated, this device allows for a free flow of air through the opening **3** for this extends from front to rear of the device and is so constructed that the opening allows for sufficient air to pass around the exhaust pipe to meet the requirements of the carburetor, there is no restriction of air passage.

Arrows indicate passage of air, this air passes around entire exhaust pipe utilizing heat from the exhaust pipe.

Both front and rear ends of this device are closed up, so as not to allow any heat loss by the air flow from the fan or in a moving vehicle the natural air flow.

The bottom section of this device is hinged, allowing for installation over exhaust pipe. Bottom section is held up against exhaust pipe by a spring clip, this also holds the main section of the injector in place.

In order to eliminate excessive build up of heat at the exhaust pipe I have invented a two way by-pass valve. When the heat radiation from the exhaust pipe produces 140° F. or any predetermined heat desired, this shutter opens and allows heat to escape through the bottom of the opening. When this occurs the top of this shutter opens outward and allows air to enter carburetor in the same manner as would take place were no controlled

heat injector installed on the motor. The thermostatic bimetal coil controls the air entering from the exhaust pipe and the normal air entering through the top opening by expanding thereby opening the shutter. This coil may be adjusted to open shutter at any temperature desired.

When the desired heat is attained and the shutter is open the heat from the exhaust pipe is also allowed to escape at 3. Controlled heat injectors do not build up heat at the exhaust pipe, necessary heat is extracted from the exhaust pipe only.

Any conventional clamp or spring clip may be used to hold injector to air filter connection, or carburetor throat.

What I claim is:

In an apparatus for modifying the temperature of air supplied to the inlet of an air induction system of an internal combustion engine having an exhaust manifold, said apparatus comprising, a two part air heater housing extending partly around a section lengthwise of said exhaust manifold in spaced relation thereto and providing an air inlet opening between the edge of one of said parts spaced from, and extending in the same direction with respect to said exhaust manifold, hinge means between said parts to facilitate assembly of said housing around said exhaust manifold, annular shaped end walls on opposite ends of said parts to maintain said spaced

relation, and means for holding said parts assembled on said manifold; a riser conduit for conducting heated air from said air heater housing having an outlet connected with the inlet of the air induction system, a vent opening formed by the walls of said riser, conduit, a butterfly type valve pivoted intermediate its ends on said riser conduit to swing from a first position in which both pivoted ends close said vent opening to a second position in which both pivoted ends open said vent opening and one pivoted end closes said riser between said heater housing and said inlet opening; and a thermostat for operating said valve from said first position to said second position located in said riser conduit to be exposed to the heated air from said heater housing when said valve is in said first position and to be shielded by said valve from heated air when said valve is in said second position.

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