CLAIMS

1. A diesel engine fuel supply control device which mixes petroleum-based fuel oil and unpurified waste oil and supplies mixed oil thus produced to a diesel engine as fuel thereof, the diesel engine fuel supply control device comprising:

a first fuel tank for storing the waste oil;

a second fuel tank for storing the petroleum-based fuel oil;

fuel mixing means for mixing the waste oil and the petroleum-based fuel oil;

waste oil quantity regulating means for regulating the amount of the waste oil supplied from the first fuel tank to the fuel mixing means;

petroleum-based fuel oil quantity regulating means for regulating the amount of the petroleum-based fuel oil supplied from the second fuel tank to the fuel mixing means;

fuel supply means for supplying the mixed oil mixed by the fuel mixing means to the diesel engine;

engine speed sensing means for detecting the speed of the diesel engine;

engine speed fluctuation calculating means for calculating the amount of fluctuation in the detected

engine speed with respect to a target engine speed of the diesel engine;

engine speed fluctuation determination means which determines that the amount of engine speed fluctuation represents first fluctuation amount determination information when the amount of engine speed fluctuation calculated by the engine speed fluctuation calculating means has a value smaller than a first set value, determines that the amount of engine speed fluctuation represents second fluctuation amount determination information when the amount of engine speed fluctuation falls within a range in which the amount of engine speed fluctuation is equal to or larger than the first set value but less than a predefined second set value which is larger than the first set value, and determines that the amount of engine speed fluctuation represents third fluctuation amount determination information when the amount of engine speed fluctuation calculated by the engine speed fluctuation calculating means matches the second set value;

operating state determination means which determines that a state in which the diesel engine is run in accordance with the first fluctuation amount determination information is a first operating state, determines that a state in which the diesel engine is run in accordance with the second fluctuation amount determination information is

a second operating state, and determines that a state in which the diesel engine is run in accordance with the third fluctuation amount determination information is a third operating state;

mixing ratio setting means for setting the ratio of mixing the waste oil and the petroleum-based fuel oil in accordance with the first, second and third operating states on the basis of the individual pieces of fluctuation amount determination information fed from the engine speed fluctuation determination means; and

first control means for regulating the amount of the waste oil supplied from the first fuel tank to the fuel mixing means and the amount of the petroleum-based fuel oil supplied from the second fuel tank to the fuel mixing means by controlling the waste oil quantity regulating means and the petroleum-based fuel oil quantity regulating means on the basis of the mixing ratio set by the mixing ratio setting means.

2. The diesel engine fuel supply control device according to claim 1, wherein the fuel supply means includes fuel switching means for supplying one of the waste oil and the petroleum-based fuel oil by switching to one of the fuel mixing means and the second fuel tank, the

diesel engine fuel supply control device further comprising:

second control means which controllably varies the mixing ratio set by the mixing ratio setting means in a stepwise fashion so that the ratio of mixing the waste oil is increased by outputting a control command to the mixing ratio setting means when the operating state determination means determines that the diesel engine is in the first operating state and then causes the first control means to control the waste oil quantity regulating means and the petroleum-based fuel oil quantity regulating means in accordance with the stepwise mixing ratio, controls the waste oil quantity regulating means and the petroleum-based fuel oil quantity regulating means so that the current mixing ratio set by the mixing ratio setting means is maintained by outputting a control command to the first control means when the operating state determination means determines that the diesel engine is in the second operating state, and supplies the petroleum-based fuel oil alone from the second fuel tank for a specified period of time to run the diesel engine with the petroleum-based fuel oil by outputting a switching control command to the fuel switching means to thereby purge a fuel supply system including a fuel pump and an injection nozzle constituting the fuel supply system with the petroleum-based fuel oil

when the operating state determination means determines that the diesel engine is in the third operating state.

3. The diesel engine fuel supply control device according to claim 2, wherein the operating state determination means determines that a state in which the diesel engine is run is a fourth operating state when the operating state determination means determines that the amount of engine speed fluctuation has a value exceeding the second set value, and the second control means has a control function to supply the petroleum-based fuel oil alone from the second fuel tank for a specified period of time to run the diesel engine with the petroleum-based fuel oil by outputting the switching control command to the fuel switching means to thereby purge the fuel supply system with the petroleum-based fuel oil on the basis of the fluctuation amount determination information.

4. The diesel engine fuel supply control device according to claim 3, wherein the second control means has a control function to vary the mixing ratio set by the mixing ratio setting means in a stepwise fashion so that the ratio of mixing the waste oil is decreased by outputting a mixing ratio altering command to the mixing ratio setting means each time the fuel supply system is

purged with the petroleum-based fuel oil until the speed of the diesel engine reaches the target engine speed in a stable fashion.

5. The diesel engine fuel supply control device according to claim 3, wherein the first fuel tank is further provided with a filter for removing impurities contained in the waste oil supplied from the first fuel tank to the fuel mixing means.

6. The diesel engine fuel supply control device according to claim 2, wherein the first fuel tank is further provided with a filter for removing impurities contained in the waste oil supplied from the first fuel tank to the fuel mixing means.

7. The diesel engine fuel supply control device according to claim 2, wherein the second control means has a control function to vary the mixing ratio set by the mixing ratio setting means in a stepwise fashion so that the ratio of mixing the waste oil is decreased by outputting a mixing ratio altering command to the mixing ratio setting means each time the fuel supply system is purged with the petroleum-based fuel oil until the speed of the diesel engine reaches the target engine speed in a stable fashion.

8. The diesel engine fuel supply control device according to claim 7, wherein the first fuel tank is further provided with a filter for removing impurities contained in the waste oil supplied from the first fuel tank to the fuel mixing means.

9. The diesel engine fuel supply control device according to claim **1,** wherein the fuel supply means includes fuel switching means for supplying one of the waste oil and the petroleum-based fuel oil by switching to one of the fuel mixing means and the second fuel tank, the diesel engine fuel supply control device further comprising:

a timer for managing operating time of the diesel engine and purging time required for purging a fuel supply system including a fuel pump and an injection nozzle constituting the fuel supply means with the petroleum- based fuel oil for a specified period of time at intervals of unit time; and

third control means which supplies the petroleum-based fuel oil from the second fuel tank for a specified period of time to run the diesel engine with the petroleum-based fuel oil by outputting a switching control command from the timer to the fuel switching means each time a point in time set in the timer at intervals of the unit time is reached to thereby purge the fuel supply system including the fuel pump and the injection nozzle constituting the fuel supply system with the petroleum-based fuel oil.

10. The diesel engine fuel supply control device according to claim 9, wherein the first fuel tank is further provided with a filter for removing impurities contained in the waste oil supplied from the first fuel tank to the fuel mixing means.

11. The diesel engine fuel supply control device according to claim 1, wherein the first fuel tank is further provided with a filter for removing impurities contained in the waste oil supplied from the first fuel tank to the fuel mixing means.

FIG. 1

82. TIMER

FIG. 2

26. ENGINE SPEED SENSING MEANS

38. WASTE OIL QUANTITY REGULATING MEANS

40. PETROLEUM-BASED FUEL OIL QUANTITY REGULATING MEANS

42. FUEL SWITCHING VALVE

82. TIMER

4402. ENGINE SPEED FLUCTUATION CALCULATING MEANS

4404. ENGINE SPEED FLUCTUATION DETERMINATION MEANS

4406. OPERATING STATE DETERMINATION MEANS

4408. MIXING RATIO SETTING MEANS

4410. FIRST CONTROL MEANS

4412. SECOND CONTROL MEANS

4414. THIRD CONTROL MEANS

FIG. 3

START

S11 TIMER ON?

S12 TAKE IN ENGINE SPEED SIGNAL

S13 CALCULATE AMOUNT OF FLUCTUATION IN TRUE ENGINE SPEED

S14 ASSESS AMOUNT OF ENGINE SPEED FLUCTUATION

S15 ASSESS OPERATING STATE OF DIESEL ENGINE

FIRST OPERATING STATE

SECOND OPERATING STATE

THIRD OPERATING STATE

FOURTH OPERATING STATE

S16 SET RATIO OF MIXING WASTE OIL AND LIGHT OIL

S17 VARY MIXING RATIO STEPWISE

S18 INCREASE WASTE OIL AND DECREASE LIGHT OIL

S19 SUPPLY WASTE OIL AND LIGHT OIL AT MIXING RATIO SET AT PRESENT TIME

S20 SUPPLY LIGHT OIL ONLY FROM SECOND FUEL TANK

S21 PURGE

S22 SUPPLY LIGHT OIL ONLY FROM SECOND FUEL TANK

S23 PURGE

S24 VARY MIXING RATIO STEPWISE

S25 DECREASE WASTE OIL AND INCREASE LIGHT OIL

S31 SET PURGING TIME

S32 SWITCH TO SECOND FUEL TANK

S33 PURGE