CLAIMS

1. A biomass fuel manufacturing plant comprising:

a separating section that is configured to separate oil and water from oil-containing wastewater discharged from an essential oil plant that is configured to refine essential oil from fruits containing fats and oils, and that is configured to separate the oil and water into POME oil and treated water; and

a discharged oil supply line that is configured to supply at least one of the POME oil, discharged oil at compressing discharged when compressing empty fruit bunches, and discharged oil at crushing discharged when crushing the empty fruit bunches, to at least one or more locations of a carbonization section that is configured to generate carbide by performing heat treatment with respect to the empty fruit bunches discharged from the essential oil plant and a fuel generation section that is configured to generate a fuel from the carbide.

2. The biomass fuel manufacturing plant according to claim 1,

wherein at least one of the POME oil, the discharged oil at compressing, and the discharged oil at crushing is supplied as the fuel of the carbonization section.

3. The biomass fuel manufacturing plant according to claim 1 or 2,

wherein the fuel generation section further includes a kneading section for mixing a binder with the carbide, and

wherein the discharged oil supply line is connected to at least one or more locations of the carbonization section and the kneading section.

4. The biomass fuel manufacturing plant according to claim 3,

wherein at least one of the POME oil, the discharged oil at compressing, and the discharged oil at crushing is supplied to the kneading section as a binder.

5. The biomass fuel manufacturing plant according to any one of claims 1 to 4, further comprising:

a water washing section that is configured to remove impurities contained in

the carbide by washing the carbide with water,

wherein the fuel generation section is configured to generate the fuel from the carbide washed with water by the water washing section.

6. The biomass fuel manufacturing plant according to claim 5,

wherein the water washing section includes a pool for storing water therein, a water flow generation section that is configured to cause the water in the pool to flow from one side to the other side, and an input section that is configured to input the carbide together with the water from above a water surface of the pool,

wherein the input section includes an input cylinder extending to a lower side of the water surface, and a water injection section that has a tubular shape extending from a side wall of the input cylinder into the input cylinder and that is configured to supply the water supplied from an outside into the input cylinder,

wherein the input cylinder includes an input cylinder main body, a discharge cylinder positioned below the input cylinder main body, and a connection section for connecting the input cylinder main body and the discharge cylinder in an up-down direction,

wherein a float portion for floating the discharge cylinder on the water surface is provided in an end portion below the discharge cylinder, and

wherein the connection section is deformable following a change in a height position of the discharge cylinder on the water surface.

7. The biomass fuel manufacturing plant according to claim 5,

wherein the water washing section includes a pool for storing water therein, a water amount control section that is configured to adjust an amount of water stored in the pool, a water flow generation section that is configured to cause the water in the pool to flow from one side to the other side, an input section that is configured to input the carbide together with the water from above a water surface of the pool, a transport section that is provided below the input section and that is configured to transport the carbide from one side to the other side, and a water surface detection section that detects a height of the water surface,

wherein the input section includes an input cylinder extending to a lower side of the water surface, and a water injection section that has a tubular shape extending from a side wall of the input cylinder into the input cylinder and that is configured to supply the water supplied from an outside into the input cylinder, and

wherein the water amount control section adjusts the amount of the water based on a detected value of the water surface detection section such that at least the end portion on one side in the transport section is exposed above the water surface.

8. The biomass fuel manufacturing plant according to claim 5,

wherein the water washing section includes a pool for storing water therein, a water flow generation section that is configured to cause the water in the pool to flow from one side to the other side, an input section that is configured to input the carbide together with the water from above a water surface of the pool, and a waterwheel section that is provided below the input section, has at least a lower portion below the water surface and that is configured to transport the carbide from one side to the other side,

wherein the input section includes an input cylinder disposed above the water surface, a water injection section that has a tubular shape extending from a side wall of the input cylinder into the input cylinder and that is configured to supply the water supplied from an outside into the input cylinder, and a valve portion that is provided above the water injection portion and suppresses a backward flow of the air toward the carbonization section side, and

wherein the valve portion includes a disk portion that is formed in a disk shape around a rotation shaft extending in a horizontal direction and is rotatable around the rotation shaft, and a plurality of blade portions that are disposed at intervals in a circumferential direction of the rotation shaft above a surface at least on one side of the disk portion and extend from an inner side in a radial direction of the rotation shaft toward the outside.

9. The biomass fuel manufacturing plant according to claim 4,

wherein the fuel generation section includes a molding section that is configured to mold a mixture of the carbide and the binder into a predetermined shape.

10. A biomass fuel manufacturing plant comprising:

a separating section that is configured to separate oil and water from oil-containing wastewater discharged from an essential oil plant that is configured to refine essential oil from fruits containing fats and oils, and that is configured to separate the oil and water into POME oil and treated water;

a carbonization section that is configured to generate a carbide by performing heat treatment with respect to empty fruit bunches discharged from the essential oil plant;

a water washing section that is configured to remove impurities contained in carbide by washing the carbide with water;

a fuel generation section that is configured to generate a fuel from the carbide washed with the water by the water washing section; and

a discharged oil supply line that is configured to supply at least one of the POME oil, discharged oil at compressing discharged when compressing empty fruit bunches, and discharged oil at crushing discharged when crushing the empty fruit bunches, to at least one or more locations of the carbonization section and the fuel generation section.

11. A biomass fuel manufacturing plant system comprising:

the biomass fuel manufacturing plant according to any one of claims 1 to 9;

a compression section that is configured to compress the empty fruit bunches;

a crushing section that crushes the compressed empty fruit bunches; and

a discharged oil supply section that is configured to supply at least one of POME oil generated in the separating section, the discharged oil at compressing generated in the compression section, and the discharged oil at crushing generated in the crushing section to at least one location of the carbonization section and the

fuel generation section through the discharged oil supply line,

wherein the biomass fuel manufacturing plant further includes a drying section that is configured to dry the crushed empty fruit bunches.

12. A biomass fuel manufacturing plant system comprising:

the biomass fuel manufacturing plant according to claim 10;

a compression section that is configured to compress the empty fruit bunches;

a crushing section that crushes the compressed empty fruit bunches; and

a discharged oil supply section communicating with the discharged oil supply line that is configured to supply at least one of the POME oil generated when separating oil and water from the oil-containing wastewater discharged from the essential oil plant, the discharged oil at compressing generated in the compression section, and the discharged oil at crushing generated in the crushing section to at least one location of the carbonization section and the fuel generation section,

wherein the biomass fuel manufacturing plant further includes a drying section that is configured to dry the crushed empty fruit bunches.

13. The biomass fuel manufacturing plant system according to claim 11 or 12,

wherein the discharged oil supply section is configured to supply the POME oil as at least the fuel for the heat treatment to the carbonization section.

14. The biomass fuel manufacturing plant system according to claim 11 or 12,

wherein the drying section includes a storage section for storing the crushed empty fruit bunches therein and discharging water content contained in the empty fruit bunches by a weight of the empty fruit bunches.

15. The biomass fuel manufacturing plant system according to claim 14,

wherein the storage section includes a cover section that covers the stored empty fruit bunches from above and is formed of a material having light transmitting properties through which sunlight is transmitted.

16. The biomass fuel manufacturing plant system according to claim 11 or 12,

wherein a plurality of plantations respectively have the compression section, and the compressed empty fruit bunches is recovered and sent to the crushing section from the plurality of plantations.

17. A biomass fuel manufacturing method comprising:

a separating step of separating oil and water from oil-containing wastewater discharged from an essential oil plant that is configured to refine essential oil from fruits containing fats and oils, and separating the oil and water into POME oil and treated water; and

a discharged oil supplying step of supplying at least one of the POME oil, discharged oil at compressing discharged when compressing empty fruit bunches, and discharged oil at crushing discharged when crushing the empty fruit bunches, to at least one or more locations in a carbonization step of generating carbide by performing heat treatment with respect to the empty fruit bunches discharged from the essential oil plant and a fuel generation step of generating a fuel from the carbide,

wherein, in the discharged oil supplying step, at least one of the POME oil, the discharged oil at compressing, and the discharged oil at crushing is supplied to at least one location in the carbonization step and the fuel generation step.

18. The biomass fuel manufacturing method according to claim 17,

wherein at least one of the POME oil, the discharged oil at compressing, and the discharged oil at crushing is supplied as the fuel of the carbonization step.

19. The biomass fuel manufacturing method according to claim 17 or 18,

wherein the fuel generation step further includes a kneading step of mixing a binder with the carbide, and

wherein the discharged oil supplying step is configured to supply at least one of the POME oil, the discharged oil at compressing, and the discharged oil at

crushing to the kneading step.

20. The biomass fuel manufacturing method according to claim 19,

wherein at least one of the POME oil, the discharged oil at compressing, and the discharged oil at crushing is supplied to the kneading step as a binder.

21. The biomass fuel manufacturing method according to any one of claims 17 to 20, further comprising:

a water washing step of removing impurities contained in the carbide by washing the carbide with water,

wherein the fuel generation step is configured to generate the fuel from the carbide washed with the water in the water washing step.

22. The biomass fuel manufacturing method according to claim 20,

wherein the fuel generation step includes a molding step of molding a mixture of the carbide and the binder into a predetermined shape.

23. The biomass fuel manufacturing method according to any one of claims 17 to 22, further comprising:

a compression step of compressing the empty fruit bunches in the previous process of the carbonization step;

a crushing step of crushing the compressed empty fruit bunches; and

a drying step of drying the crushed empty fruit bunches.

24. The biomass fuel manufacturing method according to claim 23,

wherein the compression step is performed at a plurality of locations, and

wherein the method further comprises a recovery step of recovering the compressed empty fruit bunches between the compression step and the crushing step.

25. A biomass fuel manufacturing method comprising:

a carbonization step of generating a carbide by performing heat treatment with respect to empty fruit bunches discharged from an essential oil plant by using discharged oil discharged from the essential oil plant that is configured to refine essential oil from fruits containing fats and oils as a fuel;

a water washing step of removing impurities contained in the carbide by washing the carbide with water; and

a fuel generation step of generating the fuel from the carbide washed with the water in the water washing step.

26. A biomass fuel comprising:

a carbide of empty fruit bunches obtained from fruits containing fats and oils; and

a binder for adhering the carbides to each other,

wherein the binder includes at least one of POME oil obtained by separating oil and water from oil-containing wastewater discharged when generating essential oil from fruits, discharged oil at compressing discharged when compressing the empty fruit bunches, or discharged oil at crushing discharged when crushing the empty fruit bunches.