CLAIMS

1. A metal powder manufacturing device comprising:

an atomization tank;

a crucible in which a melting metal is stored;

a molten metal nozzle that allows the melting metal stored in the crucible to flow downward into the atomization tank; and

a fluid spraying nozzle including a plurality of spraying holes that spray a fluid to an atomization tank-side end part of the molten metal nozzle to pulverize the melting metal flowing downward from the molten metal nozzle, wherein

the molten metal nozzle includes a molten metal nozzle body, and an orifice part having an inside diameter equal to or smaller than an inside diameter of the molten metal nozzle body, ~~and~~

a material of the orifice part is harder than a material of the molten metal nozzle body, and

an atomization tank-side end part, in the axial direction, of the orifice part is located above an atomization tank-side end part, in the axial direction, of the molten metal nozzle body.

2. The metal powder manufacturing device according to claim 1, wherein

a crucible-side end part, in the axial direction, of the orifice part is located below a crucible-side end part, in the axial direction, of the molten metal nozzle body.

3~~2~~. The metal powder manufacturing device according to claim 1, wherein

the orifice part is an annular member fixed to inside of the molten metal nozzle body.

4~~3~~. The metal powder manufacturing device according to claim 1, wherein

the orifice part is a member formed by being coated in an annular shape on an inside surface of the molten metal nozzle body.

5. The metal powder manufacturing device according to claim 1, wherein

an upper end part of the molten metal nozzle body and the orifice part are inserted in a nozzle fixing hole of the crucible.

6. The metal powder manufacturing device according to claim 5, wherein

a lower end part of the orifice part is supported by the upper end part of the molten metal nozzle body.

~~4. The metal powder manufacturing device according to claim 2, wherein~~

~~the orifice part is supported by the molten metal nozzle body.~~

~~5. The metal power manufacturing device according to claim 1, further comprising:~~

~~a stopper that is supported in the crucible such as to be vertically movable, and makes contact with the molten metal nozzle body at a lowered position to close a crucible-side opening of the molten metal nozzle, wherein~~

~~the material of the molten metal nozzle body is softer than a material of the stopper.~~

7. The metal powder manufacturing device according to claim 6, wherein

the orifice part is attachable to and detachable from the nozzle fixing hole of the crucible and the upper end part of the molten metal nozzle body.

8~~6~~. The metal powder manufacturing device according to claim 1, wherein

the molten metal nozzle is a plurality of molten metal nozzles that allow the melting metal stored in the crucible to flow downward into the atomization tank, and

the fluid spraying nozzle includes a plurality of spraying holes arranged in an annular pattern in a periphery of each of the plurality of molten metal nozzles.

9~~7~~. A crucible apparatus for a metal powder manufacturing device comprising:

a crucible in which a melting metal is stored; and

a molten metal nozzle that allows the melting metal stored in the crucible to flow downward into an atomization tank, wherein

a fluid is sprayed from a fluid spraying nozzle including a plurality of spraying holes provided in a periphery of the molten metal nozzle to an atomization tank-side end part of the molten metal nozzle,

the molten metal nozzle includes a molten metal nozzle body and an orifice part having an inside diameter equal to or smaller than an inside diameter of the molten metal nozzle body, ~~and~~

a material of the orifice part is harder than a material of the molten metal nozzle body, and

an atomization tank-side end part, in the axial direction, of the orifice part is located above an atomization tank-side end part, in the axial direction, of the molten metal nozzle body.

10. The crucible apparatus according to claim 9, wherein

a crucible-side end part, in the axial direction, of the orifice part is located below a crucible-side end part, in the axial direction, of the molten metal nozzle body.

11~~8~~. The crucible apparatus according to claim 9~~7~~, wherein

the orifice part is an annular member fixed to inside of the molten metal nozzle body.

12~~9~~. The crucible apparatus according to claim 9~~7~~, wherein

the orifice part is a member formed by being coated in an annular shape on an inside surface of the molten metal nozzle body.

13. The metal powder manufacturing device according to claim 9, wherein

an upper end part of the molten metal nozzle body and the orifice part are inserted in a nozzle fixing hole of the crucible.

14. The metal powder manufacturing device according to claim 13, wherein

a lower end part of the orifice part is supported by the upper end part of the molten metal nozzle body.

15. The metal powder manufacturing device according to claim 14, wherein

the orifice part is attachable to and detachable from the nozzle fixing hole of the crucible and the upper end part of the molten metal nozzle body.

~~10. The crucible apparatus according to claim 7, wherein~~

~~the orifice part is supported by the molten metal nozzle body.~~

16~~11~~. The crucible apparatus according to claim 9~~7~~, wherein

the molten metal nozzle is a plurality of molten metal nozzles that allow the melting metal stored in the crucible to flow downward into the atomization tank.

17~~12~~. A molten metal nozzle for a metal powder manufacturing device that allows a melting metal stored in a crucible to flow downward into an atomization tank, wherein

a fluid is sprayed from a fluid spraying nozzle including a plurality of spraying holes provided in a periphery of the molten metal nozzle to an atomization tank-side end part of the molten metal nozzle,

the molten metal nozzle includes a molten metal nozzle body and an orifice part having an inside diameter

equal to or smaller than an inside diameter of the molten metal nozzle body, ~~and~~

a material of the orifice part is harder than a material of the molten metal nozzle body, and

an atomization tank-side end part, in the axial direction, of the orifice part is located above an atomization tank-side end part, in the axial direction, of the molten metal nozzle body.

18. The crucible apparatus according to claim 17, wherein

a crucible-side end part, in the axial direction, of the orifice part is located below a crucible-side end part, in the axial direction, of the molten metal nozzle body.

19~~13~~. The molten metal nozzle according to claim 17~~12~~, wherein

the orifice part is an annular member fixed to inside of the molten metal nozzle body.

20~~14~~. The molten metal nozzle according to claim 17~~12~~, wherein

the orifice part is a member formed by being coated in an annular shape on an inside surface of the molten metal nozzle body.

21. The metal powder manufacturing device according to claim 17, wherein

an upper end part of the molten metal nozzle body and the orifice part are inserted in a nozzle fixing hole of the crucible.

22. The metal powder manufacturing device according to claim 21, wherein

a lower end part of the orifice part is supported by the upper end part of the molten metal nozzle body.

23. The metal powder manufacturing device according to claim 22, wherein

the orifice part is attachable to and detachable from the nozzle fixing hole of the crucible and the upper end part of the molten metal nozzle body.

~~15. The molten metal nozzle according to claim 12, wherein~~

~~the orifice part is supported by the molten metal nozzle body.~~