INDUSTRIAL WASTE MELTING/SOLIDIFYING APPARATUS

CROSS REFERENCES TO RELATED APPLICATIONS

This application claims a priority based on Japanese Patent Application No. 2006-159689 (filed on June 8, 2006), the contents of which are described in the specification of the present application.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an industrial waste melting/solidifying apparatus for melting and solidifying industrial wastes such as asbestos, pesticide residues and incineration ashes.

2. Description of the Related Art

As is conventionally done, solid matters contained in industrial wastes, such as asbestos, pesticide residues and incineration ashes, are generally stored in a combustible container made of plastic or wood, and it always has been required that the container, in a packaged state, be thrown directly into a furnace to combust the wastes in order to avoid the adverse effects thereof on the human body.

However, it is difficult to conduct a melting process on asbestos, incineration ashes, and other solid matters in an ordinary melting furnace.

As described in Japanese Unexamined Patent Application Laid-Open Publication No. 2001-317713, Japanese Unexamined Patent Application Laid-Open Publication No. H11-141848 and Japanese Unexamined Patent Application Laid-Open Publication No. H8-200637, there is proposed a process for combusting solid matters using oxygen-enriched air and melting these solid matters at a furnace temperature of 1500 °C or higher.

Further, there is generally proposed a process for obtaining high-temperature air (hot air) by heat-exchanging exhaust gas and combustion air without using oxygen-enriched air, and introducing the hot

air to a burner to set the furnace temperature to 1500 °C or higher.

However, these solid matters are mixtures of various combustible materials, thus introduction of oxygen-enriched air or high-temperature air required for combusting the combustible materials makes it difficult to control the furnace temperature and furnace pressure because the combustion speed fluctuates in accordance with the amount or quality of the combustible materials.

SUMMARY OF THE INVENTION

It is, therefore, an object of the present invention to solve the above mentioned problem and to provide an industrial waste melting/solidifying apparatus that is capable of easily controlling the combustion speed when conducting a melting process on industrial wastes by means of oxygen-enriched air or high-temperature air.

In order to achieve the above object, the first aspect of the present invention is an industrial waste melting/solidifying apparatus, which comprises: a melting furnace; a secondary furnace into which pyrolysis gas generated in the melting furnace is introduced and combusted; an oxygen generating device for supplying oxygen-enriched air to the melting furnace; and a burner provided so as to face the inside of the melting furnace, the industrial waste melting/solidifying apparatus performing a melting process on industrial wastes such as asbestos, pesticide residues and incineration ashes by throwing the industrial wastes into the melting furnace, and combusting combustible materials within the industrial wastes and fuel from the burner at high temperature by using the oxygen-enriched air, wherein: the melting furnace is formed into a box shape; the secondary furnace is connected via a communicating path to a hearth located in a lower section of the melting furnace; an entrance slot is formed on a side wall of the melting furnace, which is formed on the side opposite to the secondary furnace; a water-cooling jacket having a path of the same cross-sectional size as the entrance slot is provided horizontally on the side wall; a throw-in gate, which is made of a refractory capable of freely sliding within a gate box provided on the side wall, is provided between the entrance slot and the water-cooling jacket; an opening of the same size as

the entrance slot is formed in the throw-in gate; a throw-in door for throwing the industrial wastes is provided in the water-cooling jacket; a pusher for pushing the thrown industrial wastes out toward the entrance slot through the opening of the throw-in gate to control combustion speed is provided at the rear of the water-cooling jacket; a discharge outlet for discharging a melted material is provided on the hearth located in the lower section of the melting furnace; a burner for combusting the fuel using the oxygen-enriched air is disposed on the side wall below the entrance slot; a water tank for a water-cooled conveyor for discharging the melted material is connected to the discharge outlet; combustible contents within the industrial wastes pushed out of the entrance slot are pyrolyzed, while noncombustible contents are melted; the pyrolysis gas thus obtained is introduced into the secondary furnace via the communicating path and subjected to secondary combustion; the melted material flows through the communicating path above the hearth in parallel with high-temperature gas and is discharged from the discharge outlet formed on a bottom section of the hearth to the water-cooled conveyor; and the pressure within the water tank for the water-cooled conveyor is controlled to be lower than the pressure within the communicating path.

The second aspect of the present invention is an industrial waste melting/solidifying apparatus, which comprises: a melting furnace; a secondary furnace into which pyrolysis gas generated in the melting furnace is introduced and combusted; a hot air generating device for supplying high-temperature air, which is heat-exchanged with exhaust gas, to the melting furnace; and a burner provided so as to face the inside of the melting furnace, the industrial waste melting/solidifying apparatus performing a melting process on industrial wastes such as asbestos, pesticide residues and incineration ashes by throwing the industrial wastes into the melting furnace, and combusting combustible materials within the industrial wastes and fuel from the burner at high temperature by using the high-temperature air; wherein: the melting furnace is formed into a box shape; the secondary furnace is connected via a communicating path to a hearth located in a lower section of the melting furnace; a entrance slot is formed on a side wall of the melting furnace, which is formed on the side opposite to the secondary furnace; a water-cooling jacket having a path of

the same cross-sectional size as the entrance slot is provided horizontally on the side wall; a throw-in gate, which is made of a refractory capable of freely sliding within a gate box provided on the side wall, is provided between the entrance slot and the water-cooling jacket; an opening of the same size as the entrance slot is formed in the throw-in gate; a throw-in door for throwing the industrial wastes is provided in the water-cooling jacket; a pusher for pushing the thrown industrial wastes out toward the entrance slot through the opening of the throw-in gate to control combustion speed is provided at the rear of the water-cooling jacket; a discharge outlet for discharging a melted material is provided on the hearth located in the lower section of the melting furnace; a burner for combusting the fuel at high temperature using the high-temperature air is disposed on the side wall below the entrance slot; a water tank for a water-cooled conveyor for discharging the melted material is connected to the discharge outlet; combustible contents within the industrial wastes pushed out of the entrance slot are pyrolyzed, while noncombustible contents are melted; the pyrolysis gas thus obtained is introduced into the secondary furnace via the communicating path and subjected to secondary combustion; the melted material flows through the communicating path above the hearth in parallel with high-temperature gas and is discharged from the discharge outlet formed on a bottom section of the hearth to the water-cooled conveyor; and the pressure within the water tank for the water-cooled conveyor is controlled to be lower than the pressure within the communicating path.

The third aspect of the present invention is the industrial waste melting/solidifying apparatus described in the first or second aspect of the present invention, wherein the melting furnace is provided such that the hearth including the communicating path is removable.

The forth aspect of the present invention is the industrial waste melting/solidifying apparatus described in any of the aspect 1 through 3 of the present invention, wherein the industrial wastes are thrown by containers thereof, into the water-cooling jacket.

The present invention produces an excellent effect in that, when throwing the industrial wastes into the melting furnace, these industrial wastes are thrown using the water-cooling jacket and pusher, whereby the combustion control within the melting furnace can be carried out easily.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an entire diagram showing an embodiment of the present invention;

Fig. 2 is partial cross-sectional views showing the details of a throw-in section shown in Fig. 1 for throwing industrial wastes;

Fig. 3 is figures showing the details of a throw-in gate shown in Fig. 1;

Fig. 4 is a cross-sectional view taken along the line A-A of Fig. 1; and

Fig. 5 is an entire diagram showing another embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

"Industrial waste melting/solidifying apparatus" described and mentioned in the present specification, patent claims and the drawings is described in Japanese Patent Application No. 2006-159689.

Hereinafter, a preferred embodiment of the present invention is described in detail with reference to the attached drawings.

Fig. 1 shows an entire diagram of the industrial waste melting/solidifying apparatus of the present invention, which is constituted basically by a melting furnace 10 for combusting and melting an industrial waste W, a secondary furnace 11 for combusting pyrolysis gas generated in the melting furnace 10, and a neutralization tank 12 for neutralizing and removing halogens such as chlorine within the combustion exhaust gas generated in the secondary furnace 11.

The melting furnace 10 is formed into a box shape using a refractory, the secondary furnace 11 is also formed into a box shape or cylindrical shape using a refractory, and lower sections of the melting furnace 10 and the secondary furnace 11 are integrally connected with each other by a communicating path 13.

The lower sections of the melting furnace 10 and the secondary furnace 11 are divided into a top part and a lower part by a parting line L shown in the figure, and a hearth 10a of the melting furnace 10 and a lower section 13a of the communicating path 13 are provided removably so that these

parts can be easily replaced when worn out.

An upper section 13b of the communicating path 13 is integrated with an upper section 10b of the melting furnace 10, and the lower section 11a of the secondary furnace 11 is connected to the upper section 13b.

The upper section 10b of the melting furnace 10 and the secondary furnace 11 are supported by a mount 14, and the hearth 10a of the melting furnace 10 and the lower section 13a of the communicating path 13 are removably connected with the upper section 10b of the melting furnace 10 and the upper section 13b of the communicating path 13, respectively, by flanges (not shown) or the like at the parting line L.

A entrance slot 15 is formed on a sidewall of the melting furnace 10, which is formed on the side opposite to the secondary furnace 11, and a throw-in gate 16 made of a refractory is provided at the entrance slot 15.

In the throw-in gate 16, a sliding board 18, which is made of a refractory and in which is formed an opening 17 of the same size as the entrance slot 15 as shown in Fig. 3, is provided within a gate box 19 provided on the side wall of the melting furnace 10, so as to be able to slide freely in a vertical direction, and rods 20 of hydraulic cylinders 21 are connected with a lower section of the sliding board 18 so that the rods 20 can be moved vertically in the hydraulic cylinders 21, whereby the entrance slot 15 can be opened and closed. Furthermore, a burner 28, described hereinafter, is positioned between the hydraulic cylinders 21.

As shown in Fig. 1, Fig. 2(a) and Fig. 2(b), a water-cooling jacket 22 for throwing the industrial waste W is connected with the throw-in gate 16. The water-cooling jacket 22 is provided with a throw-in door 23, which is used for throwing the industrial waste W and can be opened and closed freely by a hydraulic cylinder 24, and is further provided with a pusher 25 for pushing out, toward the entrance slot 15, the industrial waste W thrown into the water-cooling jacket 22.

The water-cooling jacket 22 is formed to have the same cross-sectional size as the entrance slot 15, and the area between the throw-in door 23 and the entrance slot 15 is formed by a water-cooling structure. Cooling water is supplied from a feed-water line 26, which is described hereinafter, to the water-cooling jacket 22, drained off through a drainage line 27, and then returned to the neutralization tank 12 through the drainage line 27,

whereby the cooling water circulates.

The industrial waste W is, for example, composed of a container, having a size of 50 × 50 × 100 cm, housing asbestos or the like, and is thrown by the containers into the water-cooling jacket 22.

The industrial waste W, thereby, has a fixed outside dimension, and the combustion speed can be controlled by the pushing speed of the pusher 25.

As shown in Fig. 1, a side wall of the hearth 10a of the melting furnace 10 is provided with the burner 28 to which fuel such as heavy oil is supplied. Oxygen-enriched air is supplied to the burner 28 and a side wall of an upper section thereof.

The oxygen-enriched air is oxygen of a concentration of approximately 90%, which is produced by and oxygen-generating device (PSA) 30. Although not shown specifically, this oxygen-generating device 30 is constituted by a pair of nitrogen absorbing towers, and produces the oxygen by supplying compressed air to one of the absorbing towers and absorbing nitrogen. In the other absorbing tower, the absorbed nitrogen is purged and regenerated by reducing the pressure to atmospheric pressure. This process is repeated by the pair of absorbing towers alternately, whereby the oxygen is produced continuously.

The upper section 13b of the communicating path 13 is provided with a temperature detector 31 for detecting the temperature of combustion gas passing through the communicating path 13, whereby the burner 28 is controlled so that the temperature of the combustion gas becomes 1500 °C or higher.

The lower section 13a of the communicating path 13 is provided with a discharge outlet 32 for discharging a melted material S that is melted in the melting furnace 10, and a water-cooled conveyor 33 is connected to this discharge outlet 32.

The water-cooled conveyor 33 is configured as follows. That is, a scraper conveyor 36 is provided at a water tank 35 for storing cold water, so as to extend from the bottom surface to the above of the liquid surface of the water tank 35, and a discharge hood 37 that covers the scraper conveyor 36 extending from the liquid surface and discharges the melted material is provided. The melted material S, which falls from the discharge outlet 32 into the water tank 35 and is then granulated and cooled, is scraped up to

the liquid surface and discharged from a discharge outlet of the discharge hood 37 to a solid matter pit 38.

The cooling water is supplied from the feed-water line 26 into the water tank 35. An upper section of the water tank 35 is connected to the neutralization tank 12 via a steam line 40. Steam is generated in the water tank 35 by cooling the melted material. In order to prevent the steam from flowing back from the discharge outlet 32 into the communicating path 13, the pressure in the upper section of the water tank 35 is detected by a pressure gauge 39, a control valve 42 connected with the steam line 40 is opened and closed, the steam is returned to the neutralization tank 12 via the steam line 40, and the pressure within the water tank 35 is controlled to be lower than the pressure within the communicating path 13.

The secondary furnace 11 is provided with a secondary burner 44 for combusting the pyrolysis gas flowing from the communicating path 13, and this burner 44 is controlled by a temperature detector 45 provided in the secondary furnace 11. This burner 44 is supplied with normal air.

The exhaust gas generated in the secondary furnace 11 is supplied from an exhaust gas line 46 to the neutralization tank 12 via a jet scrubber 47. Feedwater and the exhaust gas are ejected from the feed-water line 26 and the exhaust gas line 46 respectively into the neutralization tank 12 by means of the jet scrubber 47.

An exhaust line 48 provided opposite to the jet scrubber 47 is connected to the neutralization tank 12, and an induced draft fan 49 is connected to the exhaust line 48. The exhaust gases from the melting furnace 10 and the secondary furnace 11 are suctioned by the induced draft fan 49 and introduced into the neutralization tank 12 via the jet scrubber 47.

The neutralization tank 12 is provided with a makeup water line 50. The liquid level within the neutralization tank 12 is detected by a level gauge 51 provided on the neutralization tank 12, and, in response to this detection, a feed water valve 52 of the makeup water line 50 is opened and closed, whereby the liquid level of the neutralization tank 12 is maintained at a constant level.

The feed-water line 26 is connected on the side opposite to the makeup water line 50 of the neutralization tank 12, and a circulating pump 54 is

connected with the feed-water line 26, whereby the water inside the neutralization tank 12 is supplied to the water-cooling jacket 22 and the water-cooled conveyor 33 via the feed-water line 26.

Caustic soda is supplied from a caustic soda supplying device 53 to the neutralization tank 12 via a neutralizing agent line 59 to neutralize the halogens such as chlorine and bromine within the exhaust gas introduced from the jet scrubber 47. This caustic soda supplying device 53 adjusts the amount of the caustic soda supplied to the neutralization tank 12, in accordance with a value detected by a pH meter 55 provided on the feed-water line 26 and located upstream of the circulating pump 54.

Further, a bottom section 12a of the neutralization tank 12 is inclined gradually downward from the jet scrubber 47 to the exhaust line 48 so that the solid content within the exhaust gas introduced from the jet scrubber 47 flows downward over the bottom section 12a.

As shown in Fig. 1 and Fig. 4, the neutralization tank 12 is provided with a separator 57 for separating the solid content within the neutralization solution. The separator 57 is configured so as to prevent the solid content from flowing toward the downstream side of the separator 57 and to cause the solid content to flow down along the separator 57 and precipitate on the bottom section 12a. Also, a gap d through which the solid content flows is formed between the separator 57 and the bottom section 12a.

A drainage line 58 for draining the solid content and excess neutralization solution is connected with the neutralization tank 12.

Next, the melting process of the present invention is described.

The throw-in door 23 is opened to throw the industrial waste W by the containers into the water-cooling jacket 22, the industrial waste W being an object to be processed. Thereafter, the door 23 is closed, the throw-in gate 16 is opened, the speed of throwing the industrial waste W into the melting furnace 10 is adjusted by means of the pusher 25, the heat radiation of the furnace is emitted to the front of the industrial waste W to gradually pyrolyze the combustible materials, and the combustion is controlled in accordance with the pusher speed.

In order to cool the industrial waste W to be thrown in by means of the water-cooling structure, the water-cooling jacket 22 prevents the generation

of clinkers and prevents the pusher function from deteriorating due to high temperatures.

The throw-in gate 16 is moved vertically by the hydraulic cylinders 21 that are connected with the lower section of the sliding board 18, and thus is not affected by the heat. Also, the size of the opening 17 of the sliding board 18 is the same as that of the entrance slot 15, thus the opening 17 serves as a guide for the industrial waste W and an end of the pusher 25, and prevents the hot air from entering from the melting furnace 10 into the water-cooling jacket 22.

The combustible materials within the industrial waste W become pyrolysis gas and flow into the melting furnace 10. The pyrolysis gas further flows downward and is combusted completely by the oxygen-enriched air that is supplied from the burner 28 provided on the side wall, whereby high temperature can be generated. Accordingly, the fuel supplied from the burner 28 can be conserved.

The high-temperature combustion gas flows over a bottom section in the vicinity of the hearth 10a to warm the area up to the discharge outlet for discharging the melted material S, and prevents the melted material S from solidifying in the furnace 10.

The melted material S falls from the discharge outlet 32 into the water-cooled conveyor 33, and is then granulated and cooled instantly.

The oxygen-generating device 30 such as a PSA produces approximately 90% oxygen and thus cannot produce a cooling effect using the nitrogen (79%). For this reason, the high temperature can be obtained extremely easily, as in the case of the combustion being performed using the air. Also, it is not necessary to introduce air for combusting the combustible contents such as plastics, as in the case of an oxygen-hydrogen burner for performing water decomposition for the same purpose. Therefore, if the plastics and the like are combusted, then it is only necessary to control the fuel so that the fuel cost can be saved.

In the case of throwing the industrial waste W again, the pusher 25 is pulled back after throwing the industrial waste w completely into the melting furnace 10, thereafter the throw-in gate 16 is closed, and then the throw-in door 23 is opened to throw the industrial waste again.

Since the hearth 10a of the melting furnace 10 can be damaged easily,

the section below the parting line L is designed to be easily removable so that the convenience of repair can be ensured.

By causing the high-temperature combustion gas to certainly pass through, at high speed, the communicating path 13 at the discharge outlet 32 for discharging the melted material S, the melted material S is prevented from being cooled and solidified, and sufficient distance is provided between the throwing location and the discharge outlet 32 so that an unmelted industrial waste W does not move therebetween easily.

Only the oxygen-enriched air is introduced into the burner 28, whereby the temperature inside the melting furnace 10 can be raised to 1500 °C or higher, and asbestos, pesticide residues, and incineration ashes that are contained in the industrial waste W can be melted, broken down, and melted/solidified respectively.

The air in the atmosphere is introduced from the burner 44 into the secondary furnace 11 for combustion, then the pyrolysis gas is combusted at 800 °C or higher, and the combustion gas is ejected along with the neutralization solution (cooling water) of the feed-water line 26 into the neutralization tank 12 by means of the jet scrubber 47, whereby the generation of dioxin is inhibited.

The halogen substances such as chlorine and bromine contained in the exhaust gas are neutralized by the neutralization solution composed of caustic soda solution within the neutralization tank 12, and solidified. The solid matters thus obtained precipitate on the bottom section 12a of the neutralization tank 12 and drained from the drainage line 58. The solid content suspended within the neutralization solution is separated by the separator 57, trapped, and then precipitated on the bottom section 12a, and only the liquid is supplied via the feed-water line 26 to the water-cooling jacket 22 or water-cooled conveyor 33 by the circulating pump 54.

Fig. 5 shows another embodiment of the present invention.

The embodiment shown in Fig. 1 explains an example in which the oxygen-enriched air is supplied from the oxygen generating device 30 to the melting furnace 10 and the burner 28, but in the present embodiment high-temperature air (hot air) is supplied to the burner 28 and the melting furnace 10 by a hot air generating device 60.

Specifically, the hot air generating device 60 is configured such that a

heat exchanger 61 is connected to the exhaust gas line 46 of the secondary furnace 11, air from a blast fan 62 is heat-exchanged with exhaust gas by the heat exchanger 61 to obtain combustion air of 800 °C or higher, and then this combustion air is supplied to the burner 28 and the melting furnace 10 via a supply line 63.

In this manner, the heat of the exhaust gas flowing through the exhaust gas line 46 is recovered by the hot air generating device 60 to raise the temperature of the combustion air to be sent to the burner 28 and the like, whereby the temperature of the melting furnace 10 can be raised to 1500 °C or higher, and the industrial waste W such as asbestos can be subjected to the melting process.

Moreover, the exhaust gas obtained after performing heat exchange at the exhaust gas line 46 is supplied into the neutralization tank 12 by means of the jet scrubber 47. At this moment, the temperature of the exhaust gas is lowered, thus less cooling load is required in the neutralization tank 12.

It should be noted that the present invention is not limited to the embodiments described above and thus can be modified in various ways. Specifically, the heat exchanger 61 shown in Fig. 5 may be connected to the exhaust gas line 46 shown in Fig. 1 to heat the oxygen-enriched air of the oxygen generating device 30 to high temperatures, or normal air may be immixed into this oxygen-enriched air, and this mixture may be supplied to the burner 28 and the like.

What Is Claimed Is:

1. An industrial waste melting/solidifying apparatus, which comprises: a melting furnace; a secondary furnace into which pyrolysis gas generated in the melting furnace is introduced and combusted; an oxygen generating device for supplying oxygen-enriched air to the melting furnace; and a burner provided so as to face the inside of the melting furnace, the industrial waste melting/solidifying apparatus performing a melting process on industrial wastes such as asbestos, pesticide residues and incineration ashes by throwing the industrial wastes into the melting furnace, and combusting combustible materials within the industrial wastes and fuel from the burner at high temperature by using the oxygen-enriched air,

wherein: the melting furnace is formed into a box shape; the secondary furnace is connected via a communicating path to a hearth located in a lower section of the melting furnace; a entrance slot is formed on a side wall of the melting furnace, which is formed on the side opposite to the secondary furnace; a water-cooling jacket having a path of the same cross-sectional size as the entrance slot is provided horizontally on the side wall; a throw-in gate, which is made of a refractory capable of freely sliding within a gate box provided on the side wall, is provided between the entrance slot and the water-cooling jacket; an opening of the same size as the entrance slot is formed in the throw-in gate; a throw-in door for throwing the industrial wastes is provided in the water-cooling jacket; a pusher for pushing the thrown industrial wastes out toward the entrance slot through the opening of the throw-in gate to control combustion speed is provided at the rear of the water-cooling jacket; a discharge outlet for discharging a melted material is provided on the hearth located in the lower section of the melting furnace; a burner for combusting the fuel using the oxygen-enriched air is disposed on the side wall below the entrance slot; a water tank for a water-cooled conveyor for discharging the melted material is connected to the discharge outlet; combustible contents within the industrial wastes pushed out of the entrance slot are pyrolyzed, while noncombustible contents are melted; the pyrolysis gas thus obtained is introduced into the secondary furnace via the communicating path and subjected to secondary combustion; the melted material flows through the

communicating path above the hearth in parallel with high-temperature gas and is discharged from the discharge outlet formed on a bottom section of the hearth to the water-cooled conveyor; and the pressure within the water tank for the water-cooled conveyor is controlled to be lower than the pressure within the communicating path.

2. An industrial waste melting/solidifying apparatus, which comprises: a melting furnace; a secondary furnace into which pyrolysis gas generated in the melting furnace is introduced and combusted; a hot air generating device for supplying high-temperature air, which is heat-exchanged with exhaust gas, to the melting furnace; and a burner provided so as to face the inside of the melting furnace, the industrial waste melting/solidifying apparatus performing a melting process on industrial wastes such as asbestos, pesticide residues and incineration ashes by throwing the industrial wastes into the melting furnace, and combusting combustible materials within the industrial wastes and fuel from the burner at high temperature by using the high-temperature air;

wherein: the melting furnace is formed into a box shape; the secondary furnace is connected via a communicating path to a hearth located in a lower section of the melting furnace; a entrance slot is formed on a side wall of the melting furnace, which is formed on the side opposite to the secondary furnace; a water-cooling jacket having a path of the same cross-sectional size as the entrance slot is provided horizontally on the side wall; a throw-in gate, which is made of a refractory capable of freely sliding within a gate box provided on the side wall, is provided between the entrance slot and the water-cooling jacket; an opening of the same size as the entrance slot is formed in the throw-in gate; a throw-in door for throwing the industrial wastes is provided in the water-cooling jacket; a pusher for pushing the thrown industrial wastes out toward the entrance slot through the opening of the throw-in gate to control combustion speed is provided at the rear of the water-cooling jacket; a discharge outlet for discharging a melted material is provided on the hearth located in the lower section of the melting furnace; a burner for combusting the fuel at high temperature using the high-temperature air is disposed on the side wall below the entrance slot; a water tank for a water-cooled conveyor for discharging the melted material is connected to the discharge outlet;

combustible contents within the industrial wastes pushed out of the entrance slot are pyrolyzed, while noncombustible contents are melted; the pyrolysis gas thus obtained is introduced into the secondary furnace via the communicating path and subjected to secondary combustion; the melted material flows through the communicating path above the hearth in parallel with high-temperature gas and is discharged from the discharge outlet formed on a bottom section of the hearth to the water-cooled conveyor; and the pressure within the water tank for the water-cooled conveyor is controlled to be lower than the pressure within the communicating path.

3. The industrial waste melting/solidifying apparatus according to claim 1 or 2, wherein the melting furnace is provided such that the hearth including the communicating path is removable.

4. The industrial waste melting/solidifying apparatus according to any of claims 1 through 3, wherein the industrial wastes are thrown by containers thereof, into the water-cooling jacket.