SCANNER SHEETS

BATCH #	TOTAL GOOD	TOTAL BAD	COMMENTS
21086	677		Finished Batc
21087	158		
21107	743		42

TOTAL GOOD IMAGES : _____

OPERATOR NUMBER: 1071 RB

SCANNER NUMBER : 7

DATE : 12-6-88

No. 861,220. PATENTED JULY 23, 1907.

J. F. MONNOT.

APPARATUS FOR PRODUCING COMPOUND METAL BODIES.

APPLICATION FILED JULY 31, 1906.

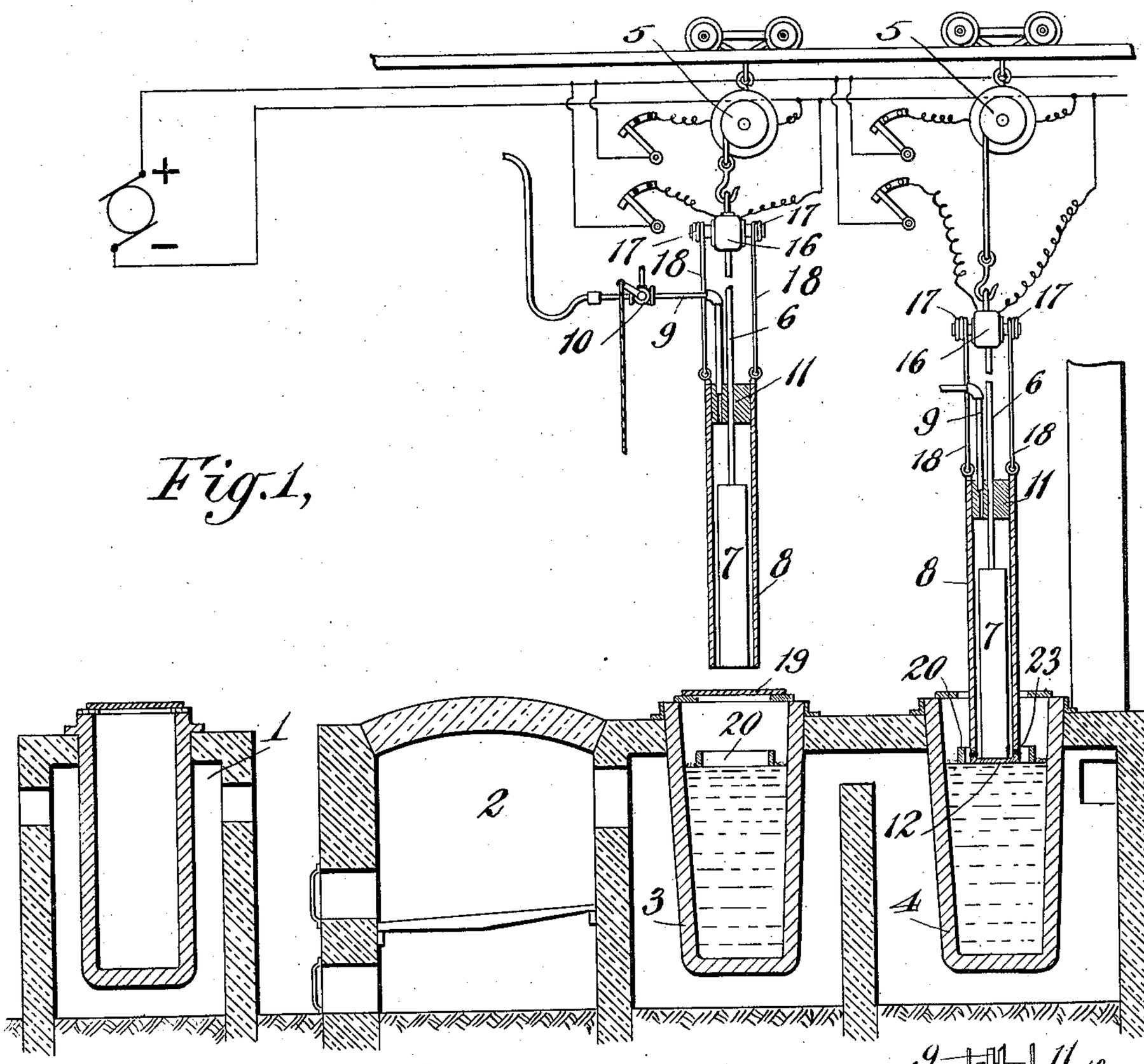

Fig. 1,

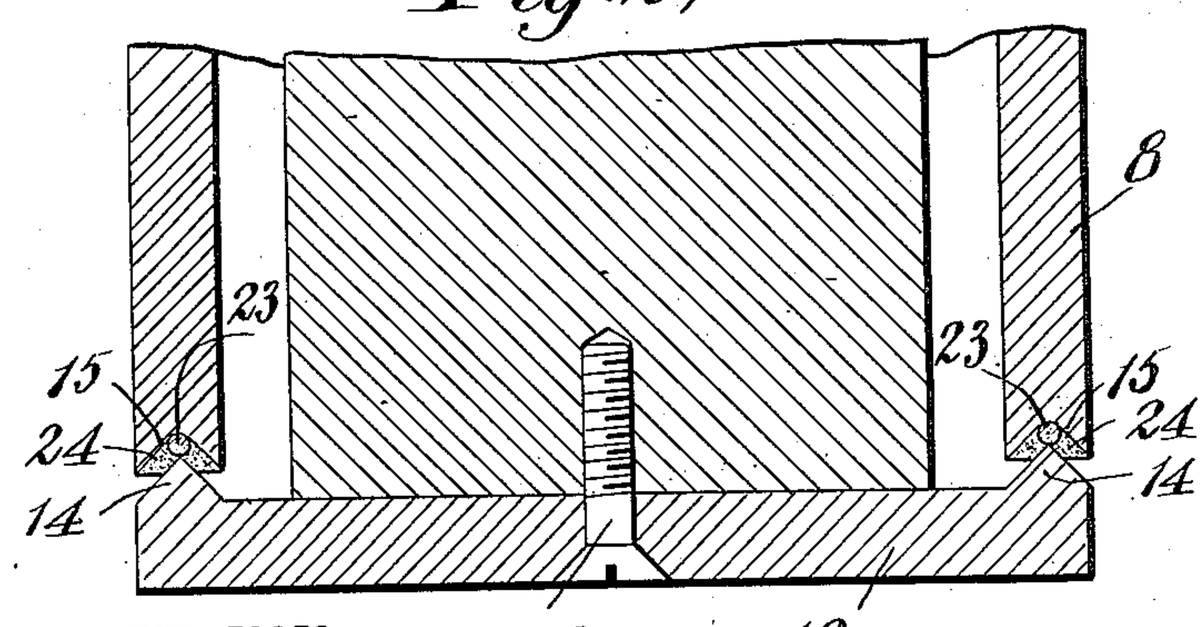

Fig. 2,

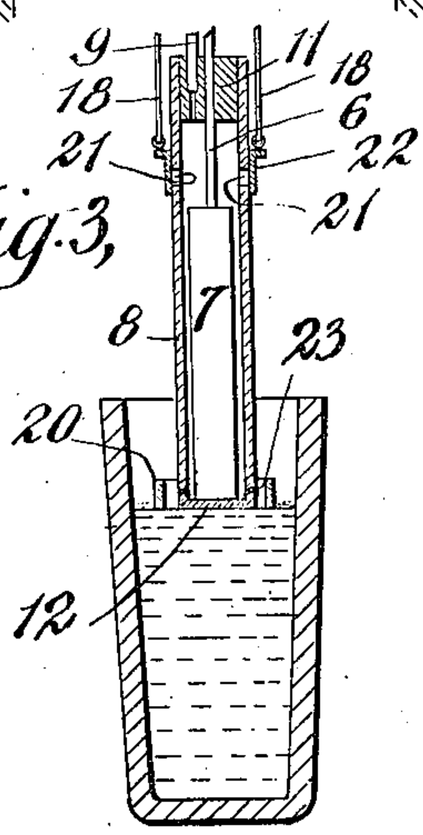

Fig. 3,

WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN FERREOL MONNOT, OF NEW YORK, N. Y., ASSIGNOR TO DUPLEX METALS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

APPARATUS FOR PRODUCING COMPOUND METAL BODIES.

No. 861,220. Specification of Letters Patent. Patented July 23, 1907.

Application filed July 31, 1906. Serial No. 328,606.

To all whom it may concern:

Be it known that I, JOHN FERREOL MONNOT, a citizen of the United States, residing in New York, county and State of New York, have invented certain new and useful Improvements in Apparatus for Producing Compound Metal Bodies; and I do hereby declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to apparatus for producing compound metal bodies, and embodies improvements in the apparatus illustrated and described in my application for Letters Patent, filed December 26th, 1905, Sr. No. 293,411 and in the apparatus illustrated and described in my application for Letters Patent filed April 10th, 1906, Sr. No. 310,910.

My said apparatus is particularly adapted for carrying out the processes set forth in my application for Letters Patent filed June 18, 1905, Sr. No. 265,508, and filed October 6, 1905, Sr. No. 281,680. According to the process of said application Sr. No. 265,508, a metal ingot or other article to be coated, is immersed in a bath of molten coating metal and then by means of a suitable casing or chamber, which is caused to surround said core while the latter is still in the bath of coating metal, a layer of said coating metal of suitable thickness is segregated from the main body of such metal, the said casing or chamber, with the article to be coated and the enveloping layer of molten coating metal therearound, being then removed from the bath of coating metal, and said segregated layer of coating metal being then allowed to solidify on the article to be coated, after which the enveloping casing or chamber is removed. This process is known as the "segregation process". The process of my said application Sr. No. 281,680, is intended for uniting unlike metals which do not weld together readily, particularly when the coating metal has a lower melting temperature than the metal to which the coating is to be applied. According to said process, the article to be coated is immersed in a bath of molten coating metal maintained at such a temperature that the molten metal is in what is known as a "supermolten" condition; a condition characterized by extreme fluidity and apparently by a considerable degree of chemical activity. The supermolten metal unites with the surface of the article to be coated. Sometimes the entire coating to be applied to said article is formed thereon at one time, by segregating from the molten metal of the supermolten bath a layer of the molten metal surrounding said article, and permitting the same to solidify against the surface of said article; and sometimes a mere film coating or "alloy-film", as it is called, is formed in the supermolten bath, and then the article to be coated is removed, under conditions precluding oxidation, is immersed in a second bath of coating metal of ordinary casting temperature, and a layer of such molten metal surrounding the film-coated surface is segregated from the main body of coating metal and caused to unite with and solidify against the alloy-filmed surface.

Commonly, but not necessarily, I heat preliminarily the articles to be coated, before immersing them in the supermolten bath; and I also clean thoroughly the surfaces of said objects—sand-blasting followed, if necessary, by pickling, being the method of cleaning commonly employed. It is important to prevent oxidation of the preliminarily heated article, also to prevent oxidation of the film-coated surfaces of such article after removal of the same from the supermolten bath, in the two-stage process just above mentioned. The alloy-film is exceedingly subject to oxidation upon removal of the object coated from the supermolten bath, owing to its very high temperature when it leaves said bath. To prevent such oxidation I employ the process of protecting highly heated surfaces from oxidation, set forth in my application for Letters Patent filed April 10, 1906, Sr. No. 310,910, which involves surrounding the surfaces to be protected with a protective atmosphere of a non-oxidizing or indifferent gas; and the apparatus herein described is adapted for carrying out said process.

The objects of my invention are to improve the construction and operation of apparatus for coating metals; to facilitate and cheapen the production of compound metal bodies; to avoid oxidation of metallic surfaces; to avoid oxidation of the molten metal; to avoid the leakage of molten metal from segregation apparatus such as described; and generally to make the apparatus simple, compact, inexpensive, easy to handle, and thoroughly reliable.

I will now proceed to describe my invention with reference to the accompanying drawings, in which certain forms of apparatus embodying my invention are illustrated, and will then point out the novel features in claims.

In the said drawings: Figure 1 shows diagrammatically a furnace for heating the ingots preliminarily, a furnace for heating the baths of molten coating metal, coating apparatus constructed and arranged to protect the ingot from oxidation and to form a coating thereon by segregation of a portion of the molten metal, and means for raising and lowering said coating apparatus and the ingot, and for operating the segregating casing. Fig. 2 is a detail sectional view showing the construction of the bottom plate and lower edge of the casing. Fig. 3 is a detail sectional view, illustrating an alternative construction of casing, adapted to fill from the top.

In the drawings, 1 indicates a chamber for preliminary heating of the ingots, arranged to be heated by circulation of hot producer gas or the like therearound.

2 indicates a furnace for heating baths of molten coating metal, 3 and 4, of which 3 may be understood to be a bath at supermolten temperature and 4 a bath at ordinary casting temperature.

5 designates a power hoist, mounted on a suitable track, for raising and lowering the ingots or articles to be coated, and the coating apparatus, and for conveying the same from place to place. 6 designates a porter bar suspended from said hoist, and 7 an ingot or article to be coated, suspended from said porter bar. Any convenient means of attaching the ingot to the porter bar may be adopted, as, for instance, threading the end of the bar and providing the ingot with a threaded orifice to receive it. 8 designates a casing adapted to inclose said ingot 7, said casing serving both to protect the heated surfaces from oxidation, and to segregate the molten metal for the coating and confine it in contact with the surface of the ingot until solidification has occurred. It is provided with a pipe 9 for supplying producer gas or other neutral or indifferent atmosphere. I have found producer gas most suitable for the purpose; ordinary illuminating gas decomposes on contact with the highly heated metal surfaces, depositing carbon thereon which prevents the formation of the desired union, and therefore illuminating gas is not a suitable material to employ. Pipe 9 is provided with a valve 10, which as shown is a three-way valve, adapted either to connect said pipe with the interior of chamber 8, or to connect said chamber to discharge. Said chamber 8 is also provided with a weight 11, which insures quick descent of the chamber into the molten metal, and also insures submersion of said chamber to the desired depth in the molten metal.

12 designates a bottom plate for the casing or chamber 8, which bottom plate is usually secured to the ingot 7 itself, by means of a screw 13. Said bottom plate is provided with a raised rib or ring, 14, of approximate V-section, adapted to enter a corresponding recess 15 in the bottom of casing 8, and thereby both to form a tight joint and to center the casing with respect to the bottom plate and ingot 7. This recess 15 commonly contains packing material, as hereinafter explained.

16 designates a power hoist, supported like the porter bar 6 from hoist 5, and provided with winding drums 17 upon which are wound cables 18 by which the casing 8 is suspended.

I do not limit myself to any particular type of hoist, but in the drawings have represented diagrammatically both hoists 5 and 16 as electrical hoists, which have the advantages of holding the load steadily when required, and of moving the same either up or down quickly, and of being simple and easily controlled.

The apparatus is operated as follows: Customarily the ingot 7 (by the term ingot as used herein I mean any object to be coated) is heated preliminarily in heating chamber 1, to avoid unnecessary chilling of the coating bath. This preliminary heating is best conducted under conditions which preclude oxidation, and hence I employ a closed chamber 1 of sufficient size to receive the ingot, around which chamber hot producer gas or other suitable indifferent hot gas may circulate. When the ingot has been heated preliminarily to the proper degree in chamber 1, the casing 8, already filled with producer gas or other indifferent or non-oxidizing atmosphere, is moved over chamber 1, the porter bar 6 lowered through said chamber and the top opening of chamber 1 and engaged with the ingot, and said ingot is then raised by the porter bar directly from chamber 1 into chamber 8, contact with the air being entirely avoided. Producer gas, which I usually employ as the protective atmosphere in chamber 8, when cold has substantially the same specific gravity as air, and when hot is much lighter than air at ordinary atmospheric temperature, and therefore leakage of the protective atmosphere out at the bottom of the casing is not to be apprehended; but to compensate for slight leakage around the porter bar, and for the tendency of gases to mix, I commonly supply gas continuously through pipe 9, excess of gas passing out at the bottom of the chamber 8, so long as the bottom plate is not in place tightly, and there burning. The chamber 8, with the ingot 7 within it, is then moved over the supermolten bath 3. If the entire coating is to be formed from the metal of this bath, the bottom plate 12 is applied to the ingot, and the casing, with the ingot within it, is lowered into bath 3 until the bottom of the casing is very nearly at the surface of the molten metal. The ingot is then dropped from the casing into the molten metal, and after it has remained therein a sufficient time (a few seconds usually suffices) the casing 8 is lowered quickly over the ingot, until it makes contact with bottom plate 12, by which plate the bottom of the casing is closed tightly. Ingot, casing and all are then raised quickly by the hoist 5. The casing, in its descent, segregates from the main body of molten metal, the layer thereof in immediate proximity to the surface of the ingot; the metal thus segregated being taken from the best part of the molten metal. The segregating casing is removed from the molten metal before it becomes highly heated, being in fact, only black when first removed and becoming red hot by absorption of heat from the molten metal within it as said molten metal solidifies. The expansion of the casing by this heating by absorption of the molten metal within it, and the contraction of the molten metal as it solidifies and cools, causes the molten metal to shrink away from the sides of the casing, while shrinking firmly on the ingot 7, and thus it is easy to remove the coated ingot from the casing 8 after the ingot has cooled.

If the main portion of the coating is to be formed from the metal in bath 4, I do not as a rule apply bottom plate 12 to the casing 8 until after dipping the ingot 7 in the metal in bath 3. As before, the casing 8, with the preliminarily heated ingot 7 within it, is lowered to the surface of the molten metal of bath 3, and the ingot is then lowered quickly from the casing 8 into the supermolten metal, and after remaining therein for a sufficient time (a few seconds usually suffices) is raised again into casing 8, the protective atmosphere of which prevents oxidation of the thin alloy-film which now covers the surfaces of the ingot. The bottom plate 12 is now applied, the chamber 8 is lowered into the bath 2 until it is nearly to the surface of the molten metal, and then the ingot is lowered from the casing 8 into the molten metal, and after sufficient time has elapsed for the molten metal to unite with the alloy-film on the surface of the ingot (a few seconds usually suffices) the