EUREKA+
TECHNOLOGIES

NEW ECOLOGICAL WAY

For the recovery of used waste active carbon
In Gold Mines of the World

PROCESSING OF GOLD-BEARING CARBON FROM GOLD MINING FACTORIES

FROM CARBON FINES TO GOLD BARS

«Eureka+» technological process Australian Patent Registered № 201942673 PCT WO2020/157543

Introduction

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The «EUREKA +» technology is the correct and only answer to the question of processing waste carbon fines to gold bars, which consists of 2 phases.

Process Overview

Every industrial gold deposit in the world has been using cyanide in its technologies for the extraction of gold and silver from ores for more than a hundred years. Thus, the cyanidation process is well established and is the main method used worldwide for gold mining. However, the mining industry has been looking for alternatives to cyanidation for many years, and currently there is no substitute that is more effective, easier to use, less costly, and safer for human health and the environment.

Cyanidation is a chemical process, as opposed to physical processes such as gravity. The mining industry uses cyanidation to extract fine gold from ores. The method is based on the principle of activated carbon leaching in columns or tanks.

Activated carbon effectively extracts gold from cyanide, as gold is adsorbed into the pores of the carbon. This has led to technologies such as CIP (coal in pulp), CIL (coal in leachate) and CIC (coal in columns).

It should be noted that in all methods, during the extraction of gold with cyanide, specific wastes containing precious metals (gold, silver, copper, etc.) are formed as a result of the decomposition of activated carbon, which is inherent in the chemical process of cyanidation.

The gold content of these activated carbon tailings varies greatly from 100 grams per ton to 1 kg. per ton.

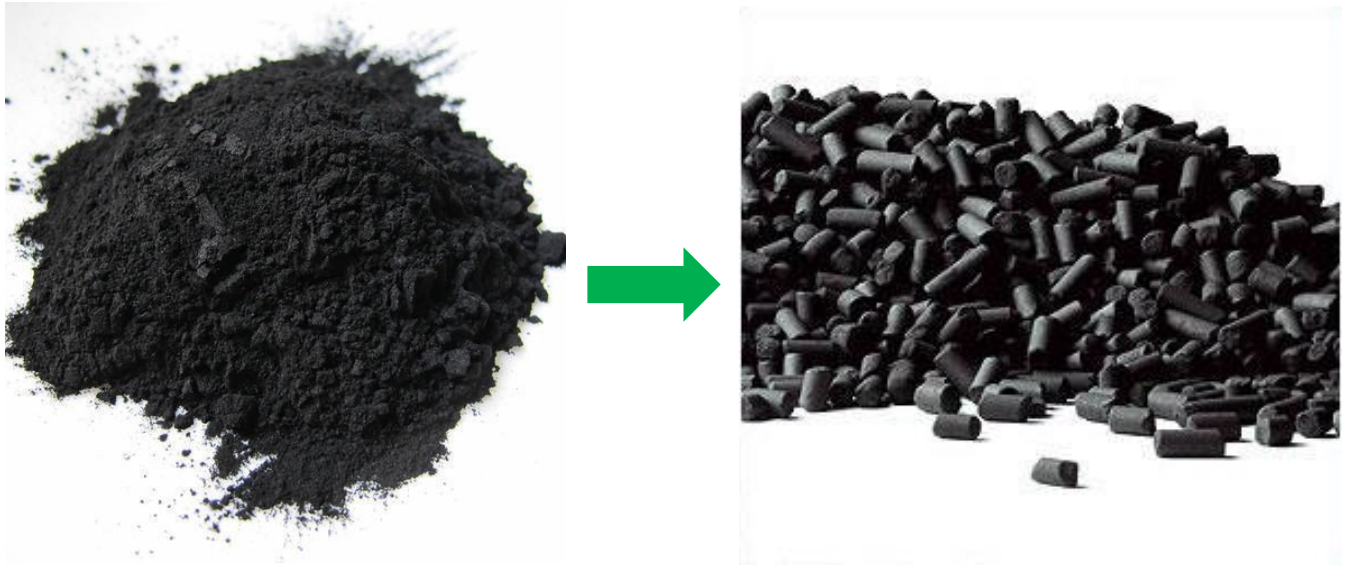
With gold prices below $1,000 USD per ounce until 2010, industrial gold mines were not interested in recycling waste activated carbon. However, with the price of an ounce of gold 2500 US dollars, the economy of enterprises is increasingly interested in processing also additional raw materials in the form of waste activated carbon.

With the development of environmental friendliness in the production system of gold mines and the ever-increasing value of activated carbon waste, a new environmentally friendly, efficient and innovative processing technology had to emerge.

Eureka+ processes has 2 phases:

“EUREKA+” - Phase I

New technology



Description

- Activated carbon, in the process of sorption, desorption and reactivation, loses its qualities and becomes too small to be reused in the adsorption leaching process, so it is removed and no longer used in the process.
- Waste activated carbon of low quality contains an average of 50-500 grams of gold per ton, although in real conditions this figure can vary from 30-1000 grams of gold per ton. The gold mining companies are forced to constantly increase the volume of gold mining, so sooner or later they come to the decision that it is necessary to extract gold from fine coal waste as well.
- By making small changes to the production process to capture as much of the lower quality activated carbon as possible, gold refineries can quite easily recover significant amounts of gold from the production waste. However, this requires a reliable and inexpensive method for extracting gold from fine coal waste.
- VALOR CANADA INC. introduces the new patented «EUREKA+» technology, a technical solution that has completely changed the way gold is extracted from uncalibrated activated carbon particles.
- Some mines store gold-bearing carbon when the amount of the precious metal is high enough (as well as gold).
- The 1st stage of technology is the manufacture of specific granules from powder fine carbon.

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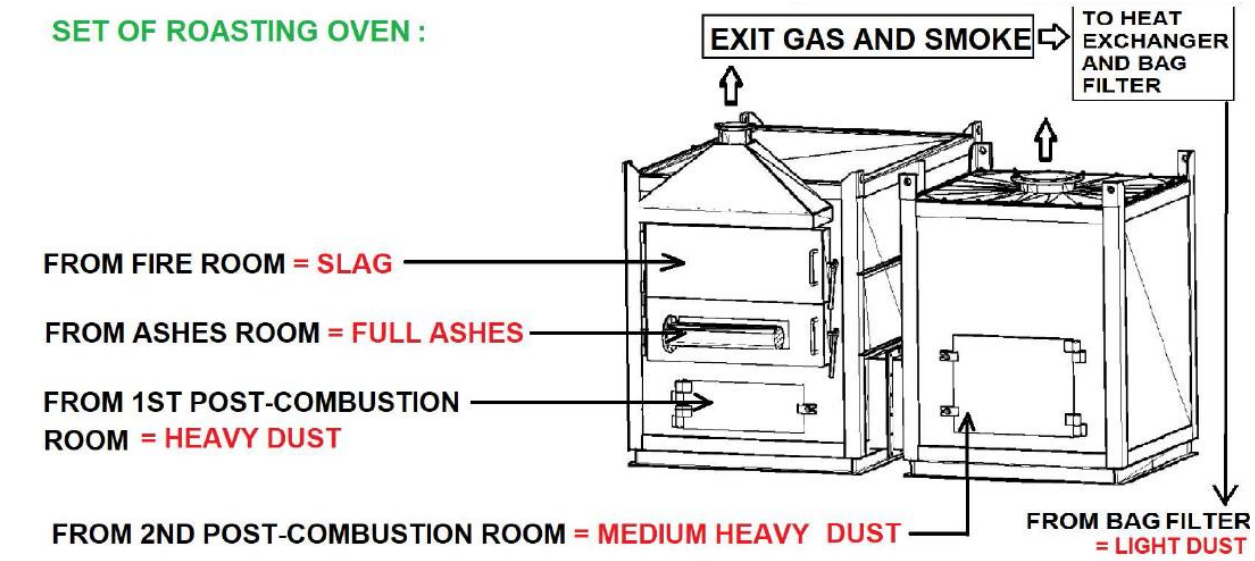
“EUREKA+” - Phase I

A simple but smart process

Roasting Parameter



Description

Second stage is the roasting of pellets in specific oven (conception EUREKA+) to obtain gold concentrate.

The «EUREKA +» plant uses advanced high-temperature combustion technology using two chambers: one for combustion and 1st post-combustion, the 2nd for the gas and medium heavy dust afterburning system (Figure: SET OF ROASTING OVEN). The burning process is accompanied by a heat exchanger and a special filter.

The above scheme allows the release of gold from coal into fly ash, which is then captured by a high efficiency filter. The product collected in the filter is incinerated again, since its carbon content is 1% higher. It should be noted that all produced and received gold concentrate (SLAG+ASHES+HEAVY+MEDIUM HEAVY DUST+LIGHT DUST) must contain less than 1% carbon. The weight of gold concentrate is between 45/48% of the weight of fine carbon at the origin.

The entire waste activated carbon recycling process is fully automated, which maximizes plant productivity. The «EUREKA +» technology guarantees the degree of extraction of 98-99% of the gold contained in the waste carbon fines.

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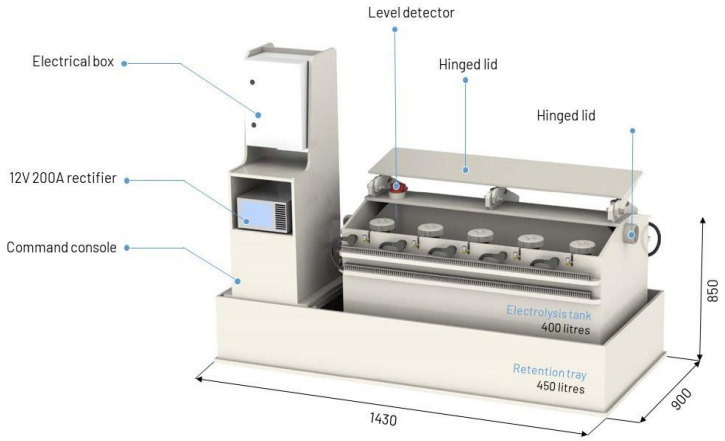
“EUREKA+” - Phase II

The new compact and reliable electrolysis line provides optimum recovery of precious metals



Process description

1. The gold concentrate obtained from carbon fines by high quality controlled roasting with a very low percentage of carbon (C) and sulfide (S) is further processed by leaching with a cyanide solution and electrolysis in a special cartridge designed for the production of gold bars.

2. After obtaining the gold-bearing concentrate using the «EUREKA+» technology, phase I, the second stage is implemented, that is, phase II: leaching + electrolysis.

3. The resulting gold concentrate is processed on a new electrolysis line, where the extraction of precious metals takes place in disposable special cartridges, which are melted directly in the process of making gold bars. To achieve a recovery close to 100%, the waste from the electrolysis line is treated on resin filters, which are also melted. The final electrolysis emissions are neutralized at the end of the process, which allows them to be disposed of without danger to humans and the environment.

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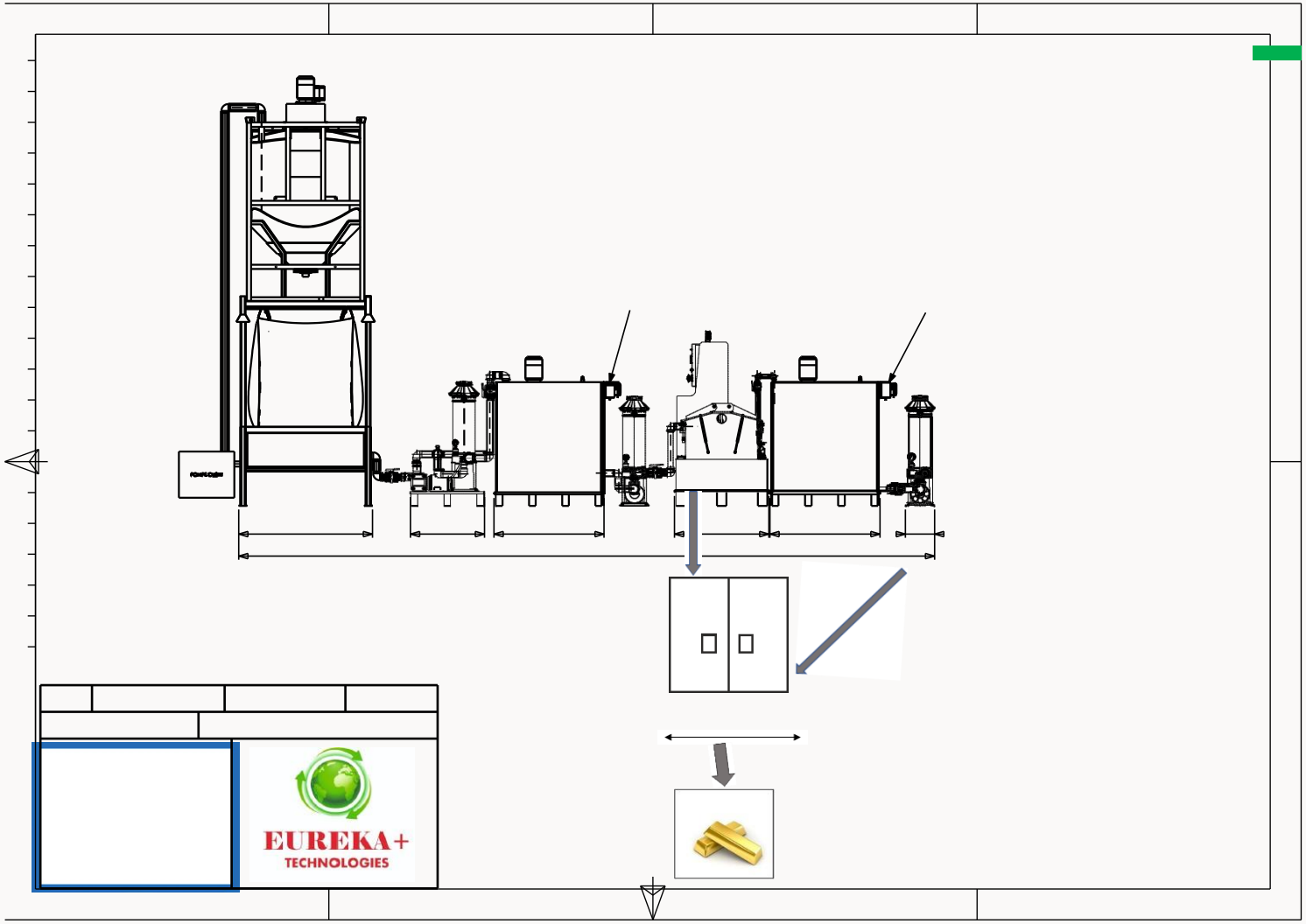
Flowsheet of the gold extraction line by industrial electrolysis using a cartridge and resin



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3D View of the Line of a New Industrial Electrolysis using method special cartridges and resin

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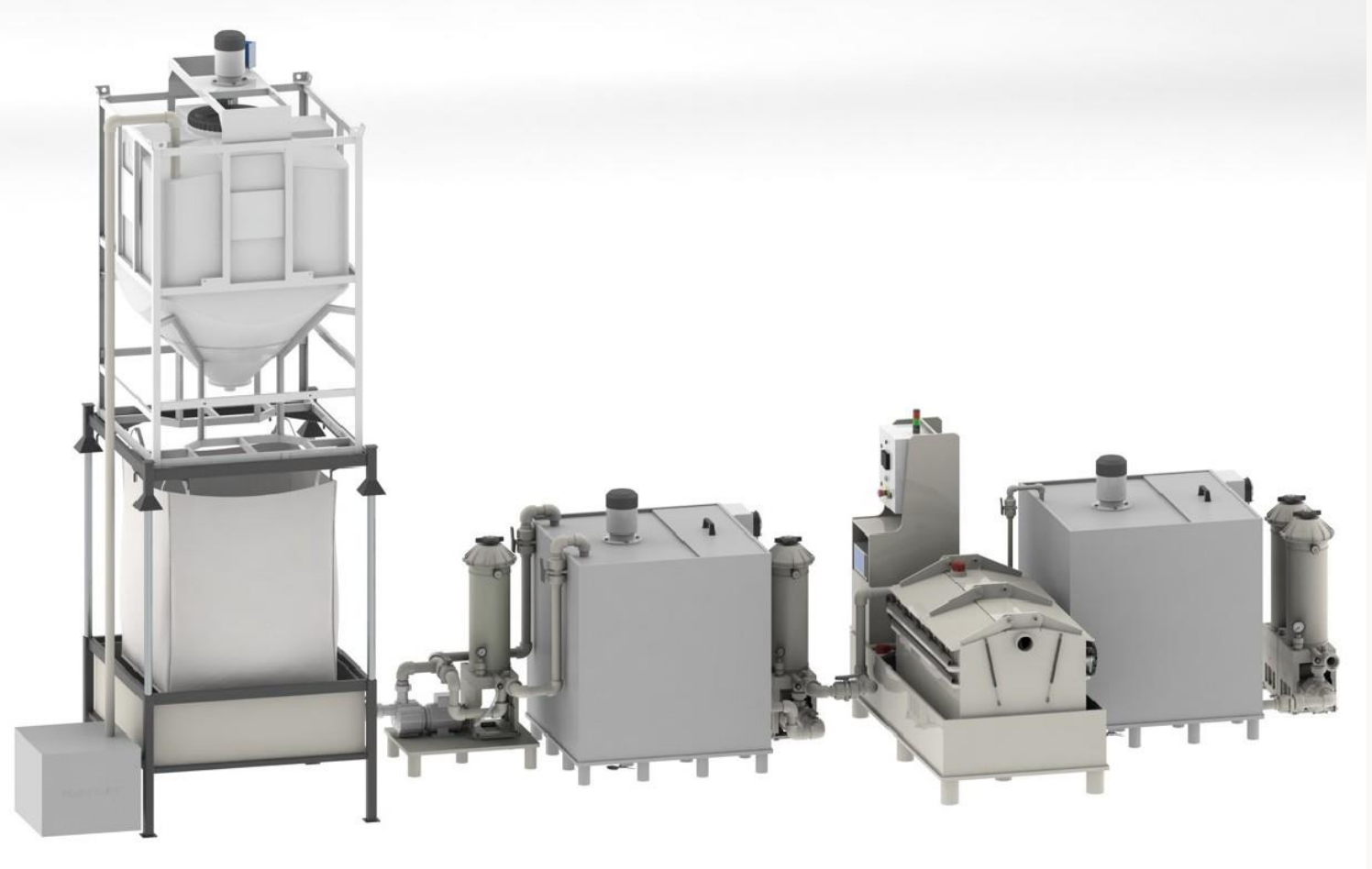

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Overall Flowsheet Phase 1 and Phase 2

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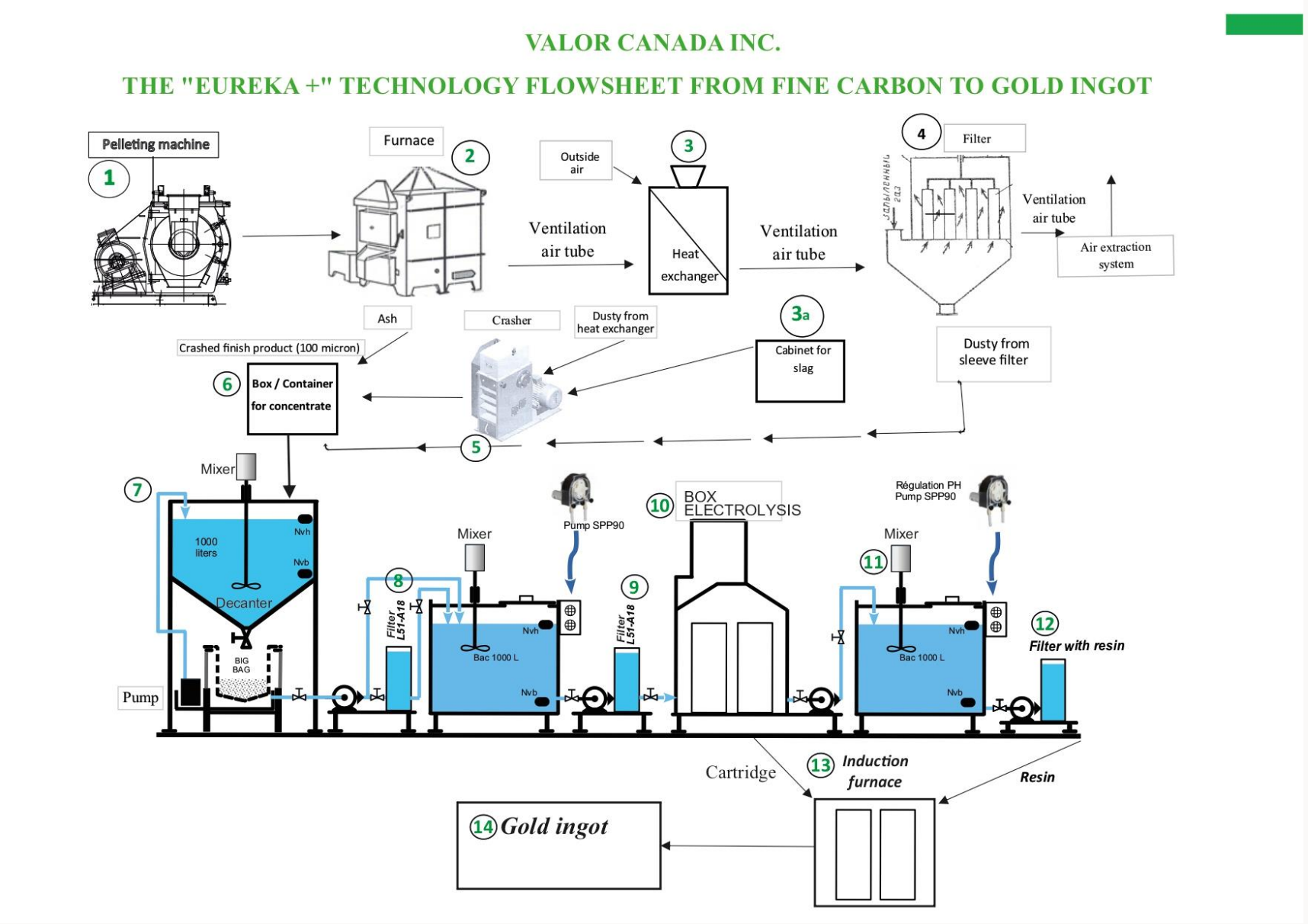

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Key points of “EUREKA+” Phase II

Detailed description

- The obtained high-quality gold-bearing concentrate according to the «EUREKA +» technology according to phase No.I allows it to be processed further by leaching in a cyanide solution and electrolysis in a special cartridge.
- Controlled burning makes it possible to destroy the matrix of the sulfide particle and create channels for supplying leaching reagents to fine gold. Reduction of sulfide content to less than 2% and carbon content to less than 1% allows leaching treatment in cyanide solution with recovery factors up to +95%.
- Pre-treatment with oxygen prior to the addition of cyanide has a beneficial effect on the kinetics of cyanidation.
- The leaching time in the cyanide solution varies from 6 to 12 hours, depending on the physical and chemical parameters of the processed gold concentrate.
- The use of lead denitrate has a beneficial effect on the efficiency of cyanidation and on its kinetics, providing better dissolution of gold due to the removal of sulfur ions by precipitation of PbS.
- This results in better cyanide ion availability and reduced passivation of gold surfaces.
- All these points are summed up and make it possible to obtain a gold recovery factor of +95% and does not require too fine grinding of the gold-bearing concentrate, 100 microns is enough.
- Grinding the gold concentrate too fine in the leaching process causes many costly problems downstream.
- High quality gold concentrate (S < 2%, C < 1%) + oxygenation before cyanide injection + lead denitrate = maximum recovery and low costs.
- The extraction of precious metals by electrolysis is carried out in special cartridges that do not
- contain metal elements. Cartridges after filling are melted down directly for the manufacture of gold bars.
- There are two models of disposable cartridges: 2 and 5 kg. precious metals. An ion exchange filter at the end of the electrolysis line optimizes the extraction of precious metals.
- After filling with precious metals, the ion-exchange filter is placed further into the melt to obtain bars.

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Conclusion

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The «EUREKA +» technology is a true new patented method for extracting gold from waste activated carbon. The system has successfully proven itself with the installation of a line in Central Asia (Kumtor mine in Kyrgyzstan). The system uses the process of roasting prepared pellets from waste carbon fines, after which a gold concentrate with a carbon content of less than 1% and a sulfur content of less than 2% is obtained, and a new intelligent electrolysis process with special cartridges is used.

- **HIGH RECOVERY**. With recovery rates ranging from 97 to 99%, our system is far superior to other industrial processes.
- **CONTINUOUS OPERATION**. The developed system operates in a continuous mode, the productivity is 130/150 kg/h or processing from 35 to 40 tons of raw materials per month. In addition, you need to consider the time for start-up and maintenance.
- **LOW OPERATING COSTS.** «EUREKA +» is a thermal process that also uses the heat generated during the roasting of granulated carbon fines, thereby optimizing the controlled self-combustion provided by the production of high-quality and high-calorie granules. This results in very low operating costs, allowing gold to be recovered at ultra-low concentrations.
- **RELIABILITY AND SERVICE.** The simplified design with standard equipment reduces the need for maintenance and increases uptime.
- **ECOLOGY.** High-temperature burning, the use of special filters and an intelligent and efficient electrolysis system all contribute to the implementation of the process without harming the environment.
- **MOBILE** and compact factory needs small place to install around 200 m3

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28 July 2021

Notice of acceptance for patent application

Pizzeys Patent and Trade Mark Attorneys Pty Ltd
PO Box 291
WODEN ACT 2606
Australia

Your reference	70298GRA/JL/KJ
Application number	2019426739
Applicant name	Yvan Grac

Dear Pizzeys Patent and Trade Mark Attorneys Pty Ltd,

This patent application was accepted on 16 July 2021. The accepted specification incorporates the following amendments:

PCT: WO2020/157543

The total number of claims at acceptance has been reported as: 8

Notice of the acceptance will appear in the Australian Official Journal of Patents on 12 August 2021.

Please review the acceptance details attached to this letter to ensure that they are correct. If you wish to amend any details prior to the grant please do so within 3 months of the advertisement of acceptance.

An Invitation to Pay (ITP) the acceptance fee will be issued to you. This fee will include an additional component if the number of claims exceeds 20.

Details of this patent application can be viewed on AusPat, our Australian patent search database.

Yours sincerely,

IP Australia

Acceptance summary

Standard patent details

Patent number: 2019426739

Title: Process for recovering non-ferrous precious metals by pelletisation and calcination of leaching activated carbon powder

Your reference: 70298GRA/JL/KJ

Number of claims at acceptance: 8

Applicant and inventor details

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Priority details: None

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C22B 11/02 (2006.01)
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