An evaluation of the Cassandra Oil AB Reactor described in Swedish patent SE 0901600-7 and in the international document WO2011/078779 of Mr. Anders Olsson

The Swedish patent and international application of Mr. Anders Olsson "invention" includes in the introduction the following statements:

Prior Art

US, A, 6 165 349 disclose a reactor comprising a reaction chamber having a rotation mechanism that consists of a shaft to which vanes are symmetrically attached by means of driving discs. The shaft is carried in bearings in both ends of the reaction chamber. An ***extensive dismounting work is required to release the vanes for service and possible replacement****.*

Summary of the Invention

A first object of the present invention is ***to provide a reactor that, with a minimum of dismounting work, allows access to the rotor including occurring vanes for service and/or replacement****. A second object of the present invention is to provide a reactor that, with a minimum of dismounting work, allows access to occurring wear surfaces in the reaction chamber/housing for service and/or replacement.*

***** The end of quotation *****

The author of this "*An analysis and an evaluation"* is the inventor and the owner of the aforesaid patents and above quoted patent US 6,165,349. The author is also the R&D director of the company Roil Trade Ltd., which carries out the development and production of the device in compliance with the awarded patents. This means, that author knows in detail all theoretical – engineering as well as practical, constructional and operational circumstances connected with the development and usage of the technology built according to the invention. This allows the author to judge and qualify similar, derived and copied technologies, which have found their inspiration in author's, in principle novelty of chemical process and reactor.

2. An analysis and evaluation

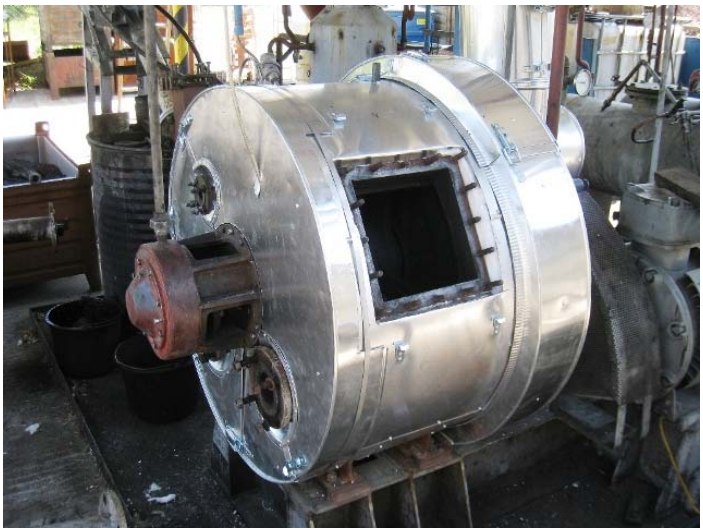
2.1 Reactor Blowdec according US 6,165,349

Being the author of the invention protected by the patent US 6,165,349 as well as the main constructor of our reactors, which are supposedly having complications with the changing of vanes*;* I state that the description of a current situation of the technique in Prior Art is **very far from the truth**. In order to change vanes/hammers it is not necessary to invest any extraordinary or remarkable effort, nor extensive dismantling work. The access to vanes/hammers and to inner parts of reactor is fairly simple; the way to do that is to

dismantle the divided reactor thermal insulation of the lid/cover of the maintenance opening and thereafter remove the lid/cover of the maintenance opening. This operation takes about 15 minutes when servicing the biggest, 800 kW reactor. The reverse process of installation is equally as simple.

Neither from the description of the patent nor from the patent claims/entitlements stated in our patent US 6.165.349 it is not possible to find out, that there is a technical difficulty with the access of the hammers/vanes. This circumstance is not stated there whatsoever, as this, replacement of vanes/hammers is secondary and irrelevant technical detail. The core subject of the patent is the overall novelty concept and new technological principles.

All our reactors – up until now five (5) of them have been built - have been equipped with the maintenance opening so that the replacement of hammers/vanes is simple. Following photos of some reactors built in compliance with our US patent 6,165,349 are the best illustration of *Prior Art* and the true state of the technique.



Picture 1 - 45 kW Blowdec reactor built in 2002 with maintenance opening

Picture 2 - 800 kW reactor built in 2007 with 2 maintenance openings
(and 45 kW reactor in workshop)

Mr. Anders Olsson, author of "the invention" of CASO reactor was present when the vanes in our R&D 45 kW device were changed. He is/was also familiar with the fact that for the inspection and for the exchange of vanes/hammers a maintenance opening is being used and no extraordinary difficult/demanding dismantling works are required for entering the inner part of the reactor.

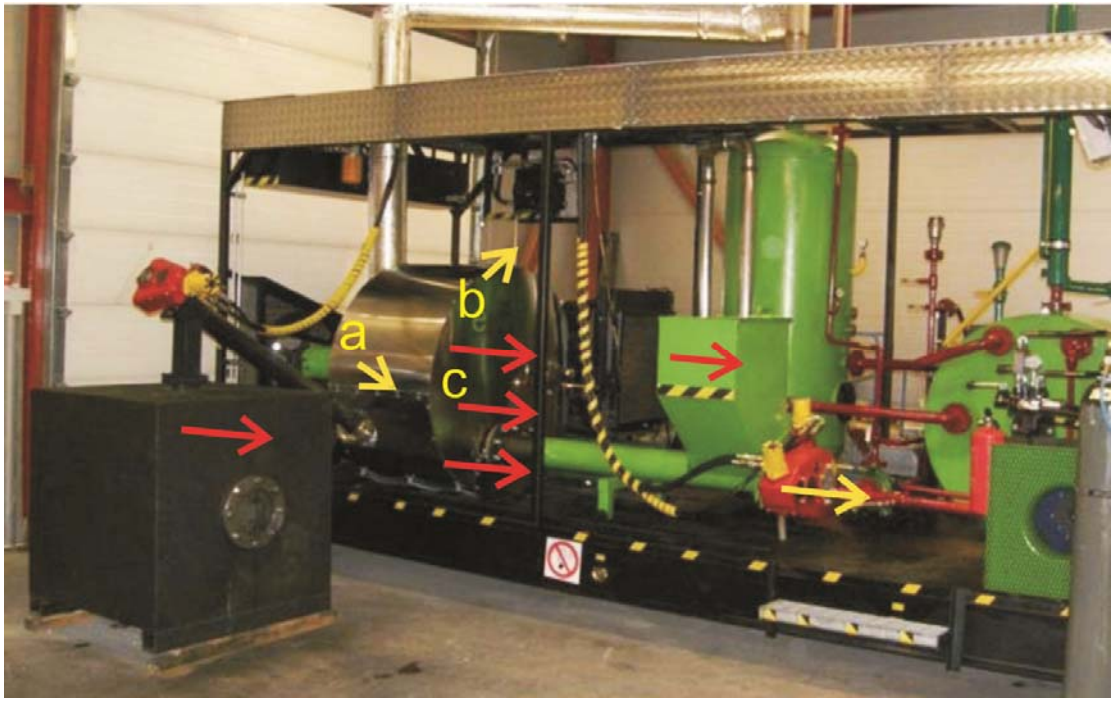
2.2 CASO Reactor according WO2011/078779

Technical solution described in Mr. Anders Olsson "invention" on other hand, brings with 'de facto' more complicated access to the vanes/hammers as well as inner parts of the chamber and thus more extensive dismantling works than in the case of our reactors.

In order to replace vanes/hammers in the CASO reactor it is necessary to dismantle the thermal insulation from the cylindrical part of reactor (at least) **6b** (Figures No. 2 and 3 from the application WO2011/078779) to enable access to the screws joining the circular flanges which connect the cylindrical part of the chamber of reactor **6a** and the part **6b.** The screws need to be disassembled and part **6a** needs to be released and moved aside from the fixed part of reactor **6b**.

Furthermore, it is necessary to move aside both feeding conveyors that are connected/mounted to the head wall of reactor **7** and also it's necessary to move aside the conveyor which withdraws so called process powder from the reactor and which is connected/mounted to the cylindrical side/part **6a** of the reactor's chamber. This conveyor is not mentioned in document WO2011/078779 and not displayed in the Figures, but without it the device cannot function. Moreover the picture of 600kW reactor which was published recently on official web site of patent application owner (www.cassandraoil.com) confirms that this empting conveyor is also part of the whole arrangement (see pictures further).

All parts which are to be moved aside, means reactor parts **7** and **6a**, both feeding conveyors with drivers and inlet material hoppers, the empting conveyor with driver and the process powder collector/hopper are installed on special carriage/carriages equipped with wheels moveable on rails.
When screws joining the circular flange which connects the fixed and removable cylindrical part of the reactor chamber are released and removed and simultaneously all moveable conveyors with accessories are pushed aside **then** the vanes and inners of reactor chamber are accessible.



Picture 3 - R&D Cassandra Oil Reactor (source www.cassandraoil.com)

a – thermal insulation joining (coaxial) line to be disassembled
b – whole insulation from reactor chamber shall be removed
c – all parts to be pushed aside (red arrows)

Picture 4 - 600 kW Cassandra Oil Reactor (source www.cassandraoil.com)

a – thermal insulation joining (radial) line to be disassembled
b – part of reactor insulation to be removed away
c – parts of the reactor and connected machinery to be pushed aside (red arrows)

The installation of the new vanes/hammers in the case of bigger devices would be quite difficult. Removing of insulation, dismantle of greater number of bolt/screws from the circular flanges of reactor chamber joining fixed and removable parts of chamber and manipulation with greater amount of mass/steel is needed. The dismantling works can take an hour or some hours, while back installation will take even longer.

The problem that is supposedly being solved by the invention contained in Mr. Olsson "invention" does not exist and the solution of it with described technique is not improving anything/ not being an improvement.
Actually, it is worsening the existing solution. This claim does not apply only to the issue of access to the vanes/hammers and inner parts of the reactor, it also applies to the entire construction/design of the reactor's concept. That is because the construction suggests the 'hung' rotor without any support on one of the ends with the heavy rotor (carrying vanes/hammers) construction placed on the end which remains unsupported. The consequence of such construction is a huge bending moment of the shaft, resulting in significantly heavier and stronger rotor and bearings construction, what is a more expensive and more complicated variant of our patented device.

Our exerted construction of Blowdec reactor brings simpler, more logical, cheaper, attested, working and reliable solution.

Ivan Mad'ar
Bratislava, June 2nd 2013