There has therefore long been felt a significant need to have innovative solutions that will allow industrial reactors to be emptied completely, rapidly, effectively and reliably of the spent catalyst particles they contain.

The applicant company has now discovered a novel technique for emptying reactors containing spent catalyst particles that makes it possible to overcome the disadvantages of the methods of the prior art.

SUMMARY

In one aspect of the present disclosure, there is provided a method for emptying a reactor containing at least one bed of spent catalyst particles and comprising at least one dump tube, which opens into the reactor at the bottom of the said bed of particles or underneath the latter, the method comprising the following successive steps:

- a first step consisting in causing a proportion of the bed of catalyst to flow out of the reactor via the said dump tube, then
- a second step of extracting the vestiges of catalyst, which is performed by sucking up the particles of catalyst remaining in the reactor at the end of the first step, using a flexible extraction sleeve introduced into the reactor via the said dump tube and connected to an extraction system situated outside the reactor, the said sleeve being provided on its external surface with protuberances which scrape the surface of the vestiges of catalyst and being able to move, inside the reactor, translationally and rotationally with respect to the said dump tube.

DESCRIPTION

One subject of the present invention is a method for emptying a reactor containing at least one bed of spent catalyst particles and comprising at least one dump tube, which opens into the reactor at the bottom of the said bed of particles or underneath the latter. The method according to the invention comprises the following successive steps:

- a first step consisting in causing a proportion of the bed of catalyst to flow out of the reactor via the said dump tube, then
- a second step of extracting the vestiges of catalyst, which is performed by sucking up the particles of catalyst remaining in the

CLAIMS

1. Method for emptying a reactor containing at least one bed of spent catalyst particles and comprising at least one dump tube, which opens into the reactor at the bottom of the said bed of particles or underneath the latter, the method comprising the following successive steps:

- a first step consisting in causing a proportion of the bed of catalyst to flow out of the reactor via the said dump tube, then
- a second step of extracting the vestiges of catalyst, which is performed by sucking up the particles of catalyst remaining in the reactor at the end of the first step, using a flexible extraction sleeve introduced into the reactor via the said dump tube and connected to an extraction system situated outside the reactor, the said sleeve being provided on its external surface with protuberances which scrape the surface of the vestiges of catalyst and being able to move, inside the reactor, translationally and rotationally with respect to the said dump tube.

2. Method according to Claim 1, characterized in that the first step is performed under gravity, by causing a proportion of the bed of catalyst to flow out of the reactor under gravity via the said dump tube.

3. Method according to either one of the preceding claims, characterized in that during the course of the first step, the proportion of the bed of spent catalyst extracted from the reactor is greater than 50 wt% of the initial bed and preferably ranges from 60 to 95 wt% of the initial catalyst bed, more preferentially from 70 to 90 wt% of the initial catalyst bed.

4. Method according to any one of the preceding claims, characterized in that during the course of the second step, the sleeve is moved by guide means located outside the reactor.

5. Method according to the preceding claim, characterized in that the means of guiding the sleeve are controlled manually, automatically or semiautomatically.