

12 Documents

Publication numbers	Title	Current assignees
DK8802947 D0	Device for cooling and/or drying bulk goods.	DIVERSEY, ...
WO200375643 A2	Process for drying high-lactose aqueous fluids	RELCO
WO9817959 A1	Shaft cooler	BABCOCK BSH
US5906482 A	Double wall vertical cooler	EXTRU TECHNOLOGY
US5375342 A	Counterflow air cooler for granular materials	DONMAR WELDING & FABRICATING
UST102201 I4	Granulation of urea phosphate from urea and merchant-grade phosphoric acid	TENNESSEE VALLEY AUTHORITY
BE-801082 A	Cooling device for kiln material	DEUTZ
BE-799140 A	Cooling material from a kiln	DEUTZ
US3721017 A	Apparatus for cooling particles	KENNEDY VAN SAUN
DE2010601 A1	Two-stage material cooler	CLAUDIUS PETERS
US3176969 A	Cooling pellets	MIDLAND ROSS
US2861353 A	Apparatus for cooling granular materials	ALLIS CHALMERS MANUFACTURING

Device for cooling and/or drying bulk goods. DK8802947 D0

Current assignees

DIVERSEY

GEELEN TECHNIEK*

Inventors

GEELEN PIERRE MARIE LAMBERT

Priority data including date

1987NL-0001318 1987-06-05

1987NL-0002798 1987-11-23

IPC - International classification

F25D-001/00*

F26B-003/08

F26B-017/10

F26B-017/14

F26B-025/10

CPC - Cooperative classification

F26B-017/14

F26B-025/10*

PCL - US patent classification

PCLO:

034583000*

Family

DK294788 D0 1988-05-30

DK294788 A 1988-12-06

EP0293976 A1 1988-12-07

JP01057071 A 1989-03-03

JPS6457071 A 1989-03-03

US4887364 A 1989-12-19

EP0293976 B1 1994-08-10

AT109883 T 1994-08-15

DE3851006 D1 1994-09-15

DE3851006 T2 1994-11-24

ES2063026 T3 1995-01-01

JP2603299 B2 1997-04-23

DK172055 B1 1997-09-29

(EP-293976)

The invention relates to a device for cooling and/or drying bulk goods, provided with a bunker (2) having a supply opening (12) for the material to be cooled, said supply opening being located near the upper side of the bunker, and with a single grate construction located near the bottom side of the bunker. The grate construction has been provided with a number of bar-shaped means (4) extending at least substantially parallel to each other. Further there are means for supplying cooling and/or drying air to the interior of the bunker through the grate construction at the bottom side of the device and for discharging said air near the upper side of the device after it has flowed through the material. The bar-shaped means can be pivoted forwards and backwards about a centre position during operation and are provided with plate-shaped parts (9-11) extending along both sides of the longitudinal axes, said plate-shaped parts being arranged such that they can overlap each other during normal operation. The centre position of the bar-shaped means is adjustable and the bar-shaped means (4) with the plate-shaped means (9-11) fixed thereto can be pivoted forwards and backwards in any set centre position. Preferably the plate-shaped parts (9-11) are perforated.

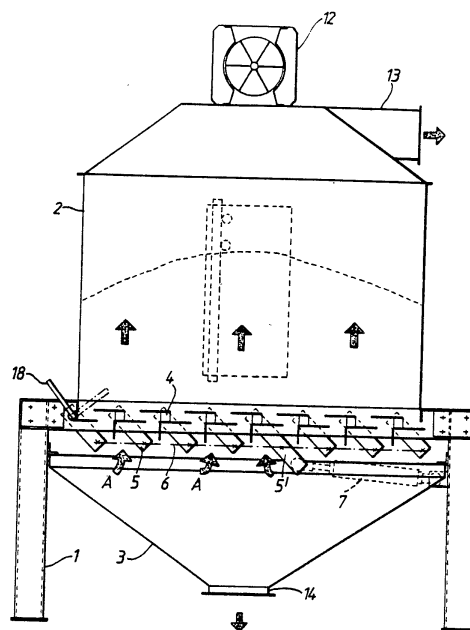


Fig. 1

Process for drying high-lactose aqueous fluids WO200375643 A2

Current assignees

KELLER TECHNOLOGIES

RELCO*

RELCO* UNISYSTEMS

Inventors

KELLER A KENT

Priority data including date

2002US-60361597 2002-03-04

2003US-10378485 2003-03-03

2003WO-US06588 2003-03-03

2007US-11731955 2007-04-02

2007US-11732018 2007-04-02

2007US-11732035 2007-04-02

2007US-11732040 2007-04-02

2007US-11732041 2007-04-02

IPC - International classification

A23B-004/00 A23C-009/00 A23C-009/154

A23P-001/00 C13B-030/02* C13K-005/00

F26B-007/00

CPC - Cooperative classification

C13B-030/02/8* C13K-005/00

PCL - US patent classification

PCLO: 426492000* 426580000* 426580000*

426580000* 426580000* 099516000*

PCLX: 034066000 034586000 034591000

099483000 099485000 099495000 099535000

127058000 127059000 127060000 127061000

426443000 426465000 426471000 426490000

426491000 426492000* 426580000*

Family

[WO03075643](#) A2 2003-09-18[CA2481023](#) A1 2003-09-18[AU2003228270](#) A1 2003-09-22[US2003200672](#) A1 2003-10-30[WO03075643](#) A3 2004-02-26[EP1488180](#) A2 2004-12-22[EP1488180](#) A4 2006-11-02[US7241465](#) B2 2007-07-10[US2007178211](#) A1 2007-08-02[US2007178210](#) A1 2007-08-02[US2007184171](#) A1 2007-08-09[US2007184170](#) A1 2007-08-09[US2007184169](#) A1 2007-08-09[NZ535730](#) A 2009-01-31[AU2003228270](#) B2 2009-06-11[US7651712](#) B2 2010-01-26[US7651714](#) B2 2010-01-26[US7651713](#) B2 2010-01-26[US7651711](#) B2 2010-01-26[US7765920](#) B2 2010-08-03[CA2481023](#) C 2012-01-10[EP1488180](#) B1 2014-08-06[ES2510641](#) T3 2014-10-21[DK1488180](#) T3 2014-11-03

(EP1488180)

Systems and methods for processing a high-lactose aqueous fluid (HLAF)(3), such as permeate from ultrafiltration of whey fluid, are described. The preferred process includes concentrating HLAF (3) containing from about 1 to about 35% solids, wherein at least 50% of the solids are lactose, to form a concentrated HLAF (3) containing from about 45 to about 65% solids; further concentrating the HLAF (3) to form a highly concentrated HLAF (3) containing from about 70 to about 80% solids; cooling the highly concentrated HLAF (3) with a gaseous fluid to create a cooling, concentrating, crystallizing cascade

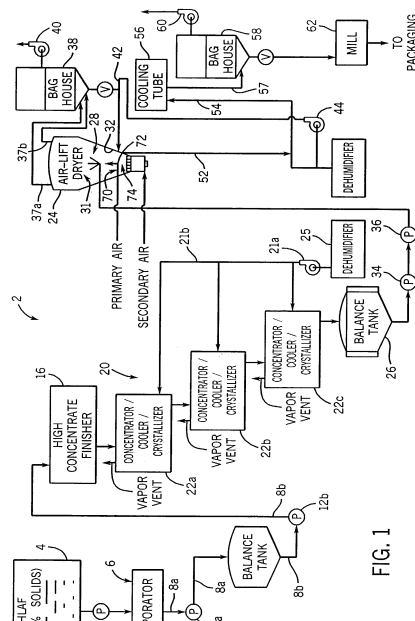


FIG. 1

to further concentrate the HLAF (3) to form a partially crystallized HLAF (3) containing from about 78 to about 88% solids; and drying the partially crystallized HLAF (3) in an air-lift dryer (24) to form a product rich in crystallizing alpha-lactose monohydrate. An air-lift dryer (24) having diverging sidewalls (32) and methods of using same are also disclosed.

Shaft cooler WO9817959 A1

Current assignees

BABCOCK BSH*

Inventors

FULDNER HELGE

Priority data including date

1996DE-1043699 1996-10-23

1996DE-2018460 1996-10-23

1997DE-2007180 1997-04-22

1997WO-EP05759 1997-10-18

IPC - International classification

F27D-015/02*

F28D-007/00

F28F-001/04

F28F-013/06

CPC - Cooperative classification

F27D-015/02/86

F28D-007/00/58

F28F-001/04*

F28F-013/06

Family

[WO9817959](#)

A1 1998-04-30

[EP0934498](#)

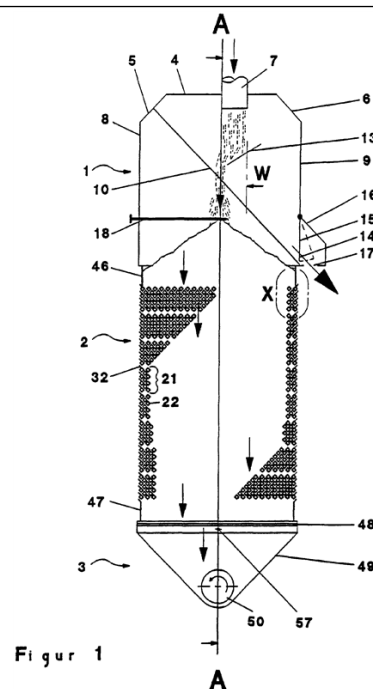
B1 2001-09-26

[EP0934498](#)

A1 1999-08-11

(EP-934498)

The invention concerns a shaft cooler which, instead of side walls, comprises in its cooling unit (2) metal side panels (32) which extend on the laterally outer pipes (22) between the walls.



Double wall vertical cooler US5906482 A

Current assignees

EXTRU TECHNOLOGY*

Inventors

TEDMAN PAUL E

Priority data including date

1997US-08886698 1997-07-01

IPC - International classification

F27D-015/02*

CPC - Cooperative classification

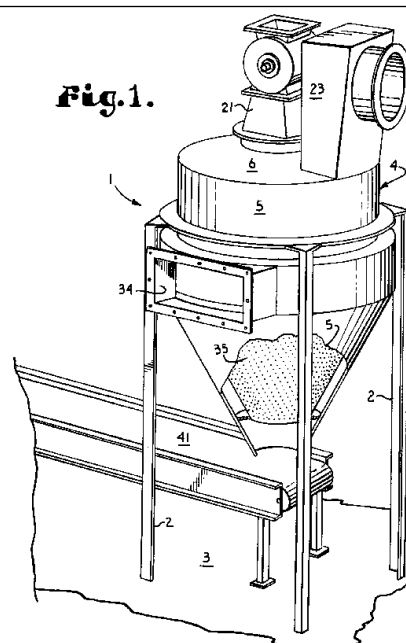
F27D-015/02/86*

PCL - US patent classification**PCLO:** 432077000***PCLX:** 432078000**Family**[US5906482](#)

A 1999-05-25

(US5906482)

A double wall vertical cooler designed for cooling extruded feed products and the like includes a cooling chamber with an upper cylindrical section and a lower frustoconical section. An outer wall surrounds the frustoconical section of the cooling chamber to form a cooling air circulating chamber. Apertures formed in a wall between the air circulating chamber and the cooling chamber allow cooling air to flow into the cooling chamber near the bottom with air flow exiting near the top as feed product is dropped from a product inlet in the top of the cooling chamber with product exiting at the bottom of the cooling chamber. The cooler design minimizes product breakage and enhances product throughput.



Counterflow air cooler for granular materials US5375342 A

Current assignees

DONMAR WELDING & FABRICATING*

Inventors

GIESLER GARY D

Priority data including date

1992US-07975437 1992-11-12

IPC - International classification

F26B-025/00*

CPC - Cooperative classification

F26B-025/00/2*

PCL - US patent classification

PCLO: 034168000*

PCLX: 034064000 034172000 034391000

034429000 034436000 414287000

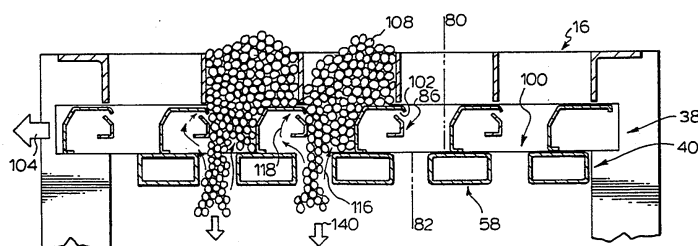
Family

[US5375342](#)

A 1994-12-27

(US5375342)

An apparatus is provided for cooling warm granular product. The apparatus includes a grate system having a first grate overlying and second grate. The first grate has a plurality of parallel generally spaced apart members, whereas the second grate has a plurality of parallel equally spaced apart beams. The first and second grate reciprocate relative to each other between a first position in which the product is retained on the grate system and a second position in which the product flows through the grate system. Each of the members in the first grate includes an air flow deflector defining a primary and secondary air outlets for dividing a flow of air into primary and secondary air streams. When the grates are in their relative second position, the secondary air stream is increased to minimize fluidization of the pellet product as it flows through the grate system.



Granulation of urea phosphate from urea and merchant-grade phosphoric acid UST102201 I4

Current assignees

TENNESSEE VALLEY AUTHORITY*

Inventors

HARRISON CECIL P

Priority data including date

1981US-06322096 1981-11-16

1984US-06605345 1984-04-30

IPC - International classification

C05B-015/00* C05B-019/00

CPC - Cooperative classification

C05B-015/00* C05B-019/00

PCL - US patent classification**PCLO:** 071029000* 071029000***PCLX:** 071043000 071064060 423306000**Family**

UST102201

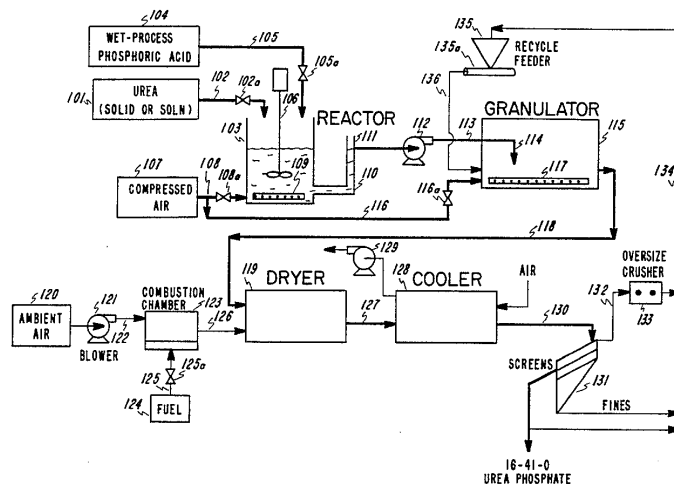
I4 1982-09-07

US4512793

A 1985-04-23

(UST102201)

A process for direct granulation of unpurified urea phosphate from urea or urea solution and merchant or filter grade wet-process phosphoric acid to produce a product with exceptional satisfactory physical and chemical properties for direct application to the soil or for use in production of fluid fertilizers. The process involves the utilization of sweep air in both the reactor and the granulator to remove water from the heat sensitive urea phosphate mixture to cause granulation of the product. The requirement for product drying with applied heat after granulation is eliminated. The process may be used for producing urea-urea phosphate provided certain precautions are taken to minimize hydrolysis of urea to prevent the resultant ammonia which in turn will react with the acid to form monoammonium phosphate.



GRUM GRANULATION OF UREA PHOSPHATE

Cooling device for kiln material BE-801082 A

Current assignees

DEUTZ*

Inventors

DEUSSNER H

Priority data including date

1972DE-2229810 1972-06-19

IPC - International classification

F27B-007/38 F27D-015/02 F28C-003/12*
F28C-003/14

CPC - Cooperative classification

F27B-007/38/3 F27D-015/02/86* F28C-003/14

PCL - US patent classification

PCLO: 432077000*

PCLX: 432079000

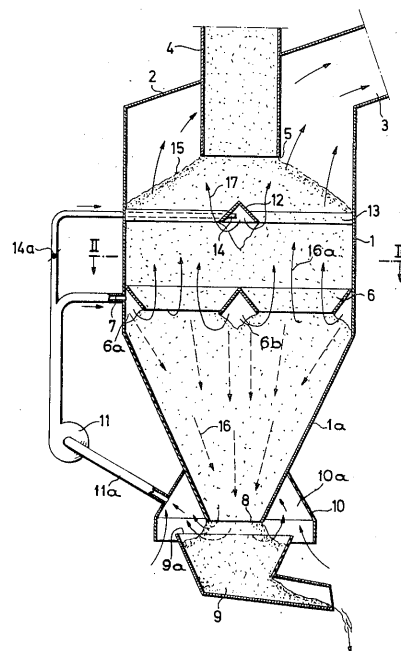
Family

BE801082 A 1973-10-15
DE2229810 A1 1974-01-17
FR2190257 A5 1974-01-25
ZA7304123 B 1974-05-29
JPS4957442 A 1974-06-04
BR7304511 D0 1974-08-15
US3837792 A 1974-09-24

IT985496 B 1974-11-30
ATA501573 A 1975-03-15
AT327079 B 1976-01-12
ES415884 A1 1976-02-01
GB1423690 A 1976-02-04
CA997555 A 1976-09-28

(US3837792)

A structure for cooling particulate hot kiln material by contact with cooling air including a cooling chamber having an upper receiving end with a lower discharge end and a rotary gas fired kiln discharging into the upper end through a feed conduit extending into the upper end of the chamber, an upper downwardly facing air distribution device, a lower downwardly facing air distribution device having radially extending spokes and an outer portion lying adjacent the wall of the cooling chamber, and opening at the lower end discharging into the hopper with an air intake chamber arranged so that air flows over the exposed surface of the material into an intake blower connected to the air distribution devices.



Cooling material from a kiln BE-799140 A

Current assignees

DEUTZ*

Inventors

DEUSSNER H

Priority data including date

1972DE-2221739 1972-05-04

IPC - International classification

C04B-007/47* F27B-007/38 F27D-015/02
F27D-019/00

CPC - Cooperative classification

F27B-007/38/3 F27D-015/02/86* F27D-2019/0009

PCL - US patent classification

PCLO: 034433000*

PCLX: 432078000

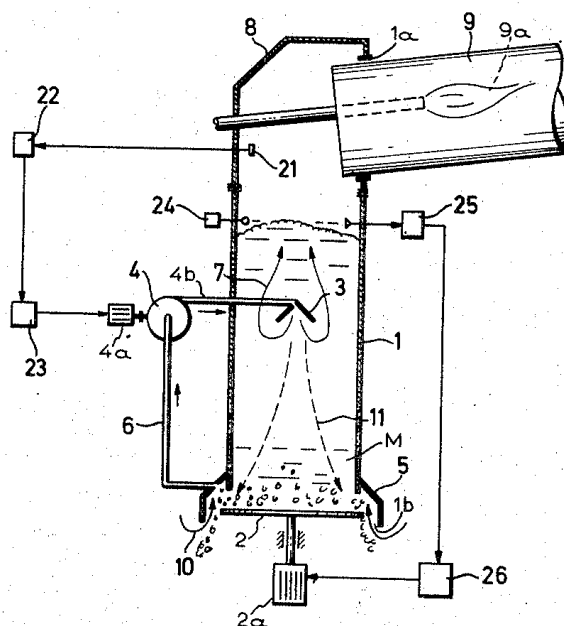
Family

BE799140 A 1973-08-31
DE2221739 A1 1973-11-15
FR2183514 A5 1973-12-14
JPS4954270 A 1974-05-27

US3815253 A 1974-06-11
IT985018 B 1974-11-30
GB1411694 A 1975-10-29
ES414202 A1 1976-01-16

(US3815253)

A method and mechanism for cooling granulate material which includes heating the material in a kiln and directing the material from a kiln into an upper inlet opening of a vertical cooling chamber with the material passing downwardly to flow out of a lower material discharge opening from the cooling chamber, and drawing air from the outside through the material at the discharge opening and forcing said air by an air pump into the material within the cooling chamber with the air flowing upwardly and passing into the kiln. A portion of the air directed into the material also flows downwardly to be recirculated.



Apparatus for cooling particles US3721017 A

Current assignees

KENNEDY VAN SAUN*

Inventors

NIEMS L

Priority data including date

1971US-05141747 1971-05-10

IPC - International classification

F27D-015/02*

CPC - Cooperative classification

F27D-015/02/86*

PCL - US patent classification

PCLO: 034167000*

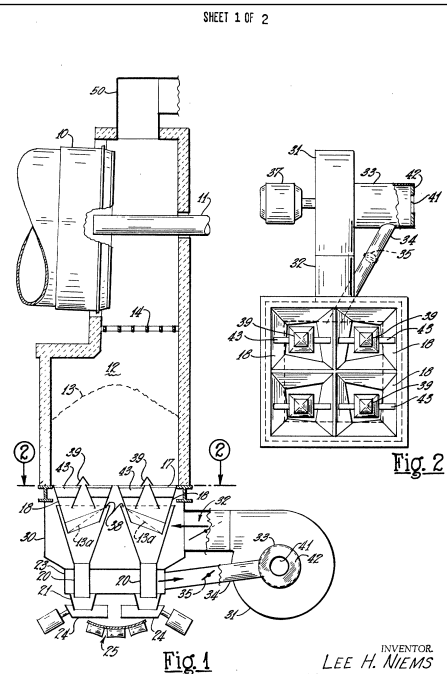
PCLX: 034168000 034170000

Family[US3721017](#)

A 1973-03-20

(US3721017)

Apparatus for cooling heated pieces of matter, particularly calcined lime pebbles or particles in which the hot material to be cooled is passed through a hopper and cooled by air introduced under pressure at the perimeter of the mass through bias aligned louvers in the side walls of the hopper. A particular aspect of the invention is the alignment of the louvers at an angle to horizontal to establish different length air paths through the mass to compensate for the different resistances to flow presented by the surface angle of repose of the material and the natural tendency of the particles to become segregated in various predeterminable regions of the mass with consequent localized concentration of heat in the mass.



Two-stage material cooler DE2010601 A1

Current assignees

CLAUDIUS PETERS*

Inventors

KAYATZ KARL-HEINZ

Priority data including date

1970DE-2010601 1970-03-06

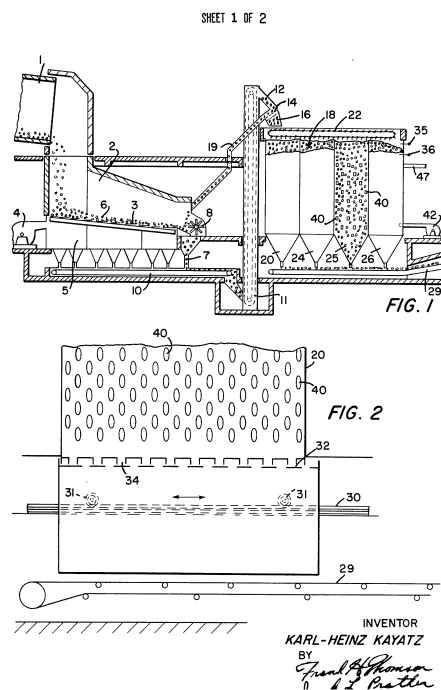
IPC - International classification

F27D-003/00* F27D-009/00 F27D-015/02

CPC - Cooperative classificationF27D-015/02/86* F27D-2003/0065 F27D-2009/0078
F27D-2015/0253**PCL - US patent classification****PCLO:** 165104180***PCLX:** 034065000 034177000 165104310
165104340 432078000 432083000**Family**[DE2010601](#) A1 1971-11-18[US3705620](#) A 1972-12-12[CA934547](#) A 1973-10-02[DE2010601](#) B2 1976-02-12

(US3705620)

A two-stage material cooler particularly adapted for cooling burning or burned material. The cooler includes a first stage direct cooler such as a grate cooler wherein air is blown through the material as it is discharged from a furnace such as a rotary kiln. The air heated by the hot material is returned as combustion air to the furnace. The partially cooled material is passed through a material breaker and supplied to an indirect cooler for further cooling. The indirect cooler includes a plurality of bins each having a plurality of spaced apart tubes therein. Cooling fluid such as air or water is passed through these tubes. The material to be cooled is placed in the top of these bins and passes downwardly therethrough to be discharged from the bottom of the bins. As material passes through the bins, it contacts the cooling tubes and is thereby cooled.



Cooling pellets US3176969 A

Current assignees

MIDLAND ROSS*

Inventors

STORM ARTHUR W

RINKER FRANK G

Priority data including date

1963US-04279997 1963-05-13

IPC - International classification

C22B-001/26* F27D-015/02

CPC - Cooperative classification

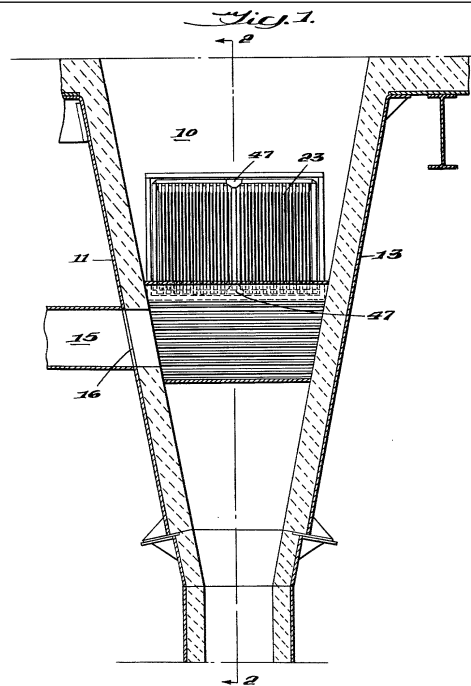
C22B-001/26* F27D-015/02/86

PCL - US patent classification**PCLO:** 432002000***PCLX:** 266195000 432075000 432077000

432098000

Family[US3176969](#)

A 1965-04-06



Apparatus for cooling granular materials US2861353 A

Current assignees

ALLIS CHALMERS MANUFACTURING*

Inventors

LELLEP OTTO G

Priority data including date

1956US-03591352 1956-06-14

IPC - International classification

F27D-015/02*

CPC - Cooperative classification

F27D-015/02/86* F27D-2015/0293

PCL - US patent classification**PCLO:** 034061000***PCLX:** 034063000 034174000 034436000

209011000 209238000 241065000

Family[US2861353](#)

A 1958-11-25

