
(2021) 03 IPAB CK 0001

In the Intellectual Property Appellate Board

Case No : Original Application No. 15 Of 2020/PT/KOL

Tony Mon George

APPELLANT

Vs

Assistant Controller Of Patents & Designs

RESPONDENT

Date of Decision : 15-03-2021

Acts Referred:

Indian Patents Act, 1970 — Section 15, 117A

Citation : (2021) 03 IPAB CK 0001

Hon'ble Judges : Dr. B.P. Singh, Technical Member; Dr. B.P. Singh, J

Bench : Division Bench

Advocate : Sachin Manocha

Final Decision : Allowed

Judgement

1. The present appeal has been filed under Section 117A of the Indian Patents Act, 1970, against the order dated 19/06/2020, passed by the

Respondent, being the Assistant Controller of Patents & Designs, under Section 15 of the Indian Patents Act, 1970, refusing to grant the

Appellant's Indian patent application no. 472/KOLNP/2011.

2. The invention as explained by the appellant is as under:

The present invention is based around the insight that the separation discs with elongate spacing elements (irrespective of whether the spacing

elements are straight and purely radial, are straight and form an angle with the radius or are curved), especially in concurrent flow separation, may

have inactive regions on the surface of the separation discs, i.e., regions which make a relatively slight or no contribution at all to the separation of

particles from the gas. Such inactive regions occur mainly at the radially outer parts of the interspaces and depending on the direction of rotation,

directly behind or in front of the respective spacing elements as viewed in the direction of rotation. Through these inactive regions, only a part of the surface of the separation disc is used for separation of particles, with consequently reduced separation efficiency of the separation disc. Thus, the present invention provides a centrifugal separator that does not have such inactive regions.

Â The present invention concerns a centrifugal separator for cleaning of gas (light phase) from solid or liquid particles (heavy phase) suspended

therein. The separator comprises a housing which delimits a separation chamber and has a gas inlet to and a gas outlet from the separation chamber.

The separator further comprises a rotor which, in turn, comprises a stack of frustoconical separation discs (22), which delimit between separation

discs of the stack, interspaces (27) for gas to flow there through. An inlet space is arranged centrally in the stack of separation disc and

communicates with the gas inlet and with the radially inner part of the interspaces. An annular flow space surrounding the rotor communicates with a radially outer part of the interspaces and the gas outlet.

The gas inlet (3) communicates (via the inlet space) with the radially inner part of the interspace (27) between the separation disc (22), and the gas

outlet communicates with the radially outer part of the interspace (27). Thus, when the gas to be cleaned travels from the gas inlet to the gas outlet,

the gas travels radially outwards through the interspaces, from the inner part to the outer part thereof. This is emphasized by feature of claim 1, i.e.,

that rotation of the rotor causes a pumping action driving the gas from the gas inlet (3), through the interspaces (27) between the separation disc (22)

and out via the gas outlet (4).

The oil and particles are separated from the gas by being forced against the inner/lower surfaces of the separation disc. The oil and particles

agglomerate along the surface of the disc and are flung from the edges of the disc onto an inner stationary surface of the separator, from where the

oil and particles flow out of the separator. It shall be duly noted that a pumping action is provided if, and only if, the gas inlet is arranged at a smaller

radius than the gas outlet. Hence, if the gas outlet would be arranged radially centrally, i.e. at least close to the radial centre of the separator, the

pumping action would in effect be severely reduced and possibly altogether

eliminated. Thus, the claimed centrifugal separator utilizes concurrent flow separation, which is common in gas separators and made possible by the very large density difference between the light phase and the heavy phase components, e.g., in the order of magnitude between 100 and 1000 times.

Â In contrast, a liquid-liquid separator (which is depicted in D3) utilizing a stack of frusto-conical separation discs would always utilize what may be

referred to as counter-current flow separation, where the lighter liquid phase travels inwards through a disk stack, whereas the heavier liquid phase

travels outwards, regardless whether the liquid mixture to be separated is introduced at a small or at a large radius in the disk stack.

The cleaned gas leaves the interspaces (27) and flows out through the gas outlet (4) via the annular flow space (28). The rotor's central inlet

space (25) is thus in communication with the annular flow space (28) via the interspaces (27). The centrifugal separator thus works according to the

concurrent flow principle for separation of particles from gas, i.e., the gas which is to be cleaned is led centrally into the rotating rotor and then flows

radially outwards through the interspaces (27) between the separation discs (22), wherein the particles in the gas, by centrifugal force, is caused to

sediment on the insides of the separation disc and thereafter slide out, in the same direction as the gas flow, towards the outer circumferential edges of

the separation disc and then be thrown towards the inside of the rotor housing.

The present invention discloses that during the movement of gases radially outwards, the gas brought into rotation will, owing to a certain rotation

speed lag relative to the rotor, flow along curved paths in the interspaces (27) between the separation discs (22). As the interspaces (27) between the

separation discs (22) in at least their radially outer part are open for flow of the gas in the circumferential direction and therefore not be blocked in its

movement along the curved paths. Thereby the whole surface of the separation disc is used for separation, since the free flow does not give rise to

said inactive regions on the separation disc (22).

3. The case of the applicant is that:

Â The technical advancement or technical advance of the present invention are:

Eliminates inactive regions having no contribution towards separation process;

Improves separation efficiency of separation disc;

Improves overall efficiency of separation process;
Provides a centrifugal separation that is easy to make;
Enhanced pumping action;
Cost effective centrifugal separator.

Â Cited document D1 (WO0136103) is directed to a method and apparatus for cleaning of gas, by means of centrifugal force, from solid or liquid

particles suspended in the gas and having a larger density than the gasâ D1 at page 1, lines 1-4 (pg. 246 of Appeal).

Â D1 does not teach or suggest a centrifugal separator that includes interspaces that are open for flow of the gas in the circumferential direction

without any obstructions. For instance, the interspaces have substantially no obstruction/no blocking to the flow of gas in the circumferential direction

throughout the entire outer radial parts of the interspaces.

Â Instead, as shown in FIG. 2 of D1, ribs (26) extend along curved paths at radially outer surrounding portions of the separation discs. The flow paths

for the gas extend along the curved ribs. Thus, the radially outer surrounding portions of the D1, separation discs obstruct flow in the circumferential

direction which is contrary to what the present invention in claim 1 of the impugned application performs.

The purpose of the ribs (26) in D1 is to collect separated particles on the surface of the separation disc (22), conducting them towards the surrounding

edges of the separation disc along the path of the ribs. See D1 et al. at page 12 (pg. 257 of Appeal), lines 22-26, reproduced below:

Owing to the ribs (26) forming an angle with the generatrices of the Separation discs the ribs will catch particles moving in contact with the Separation

discs towards the Surrounding edges thereof. The particles caught will be conducted further along the ribs (26) which, thus, will serve as guiding

members for the particles.

Â The separated particles are thereafter thrown from the separation discs (22) substantially only in limited areas along the surrounding edges of the

separation discs, i.e., at the outer end points of the ribs (26). The separation is thereby improved by reducing the risk of separated particles being

mixed back into the gas flowing in the space (28) around the rotor (1). See D1 at least at page 4 (pg. 249 of Appeal), line 18 to page 5, line 16 and

page 12, line 28 to page 13, line 19.

Â The Appellant, further, submits the difference between the present invention and D1 is that the claimed invention, as recited in claim 1, includes

feature F 1.5 ""the interspaces (27) between the separation discs (22) at least at their radially outer part are open for flow of the gas in the

circumferential directionâ?, which provides a technical advance or technical effect that â??As the interspaces (27) between the separation discs (22)

in at least their radially outer part are open for flow of the gas in the circumferential direction, the gas will flow freely in the circumferential direction

and therefore not be blocked in its movement along the curved paths. Thereby the whole surface of the separation disc is used for separation, since

the free flow does not give rise to said inactive regions on the separation disc (22)â?. See page 18 (pg. 110 of Appeal); lines 5-13 of the complete

specification as filed.

Â The separation is thereby improved by avoiding so- called inactive regions on the surface of the separation disc in countercurrent flow separation.

Accordingly, it is submitted that D1 would in fact lead a person skilled in the art away from the present invention, since the way of improving

separation in D1 is in conflict with the presently claimed invention in claim 1.

Â Hence, the essential feature of D1, i.e., the ribs (26), would constitute an obstruction to gas flow in the circumferential direction, giving rise to the

inactive regions on the surface of the separation disc.

Â Therefore, the Appellant submits that the present invention, as recited in claim 1 and the dependent claims, is novel and non-obvious to a person

skilled in the art over D1.

Â Cited document D2 (US2003178014 (corresponding application of WO2002/20954)) discloses ventilation device for a crankcase of an internal

combustion engine. The venting device for a crankcase of an internal combustion engine have a centrifugal oil separator (1) comprising a mixture inlet

(13) for an air-oil mixture and an air outlet (12) for cleaning air as well as an oil outlet (14) for oil and the centrifugal separator is designed as a plate

separator (1).

Â The crankcase ventilation device disclosed in D2 is unusual in the sense that it is devised for counter- current separation of oil from air. For this

purpose, the device comprises a compressor 15, which builds up a pressure between the second connection 13 (for air and oil) and the first connection

12. Thus, the compressor 15 draws air through the device.

Â Further, in order to separate oil from the air, the air and oil must be brought to rotate in a circumferential direction of the disc stack. Thus, the oil

particles are forced against the inner (lower) sides of the discs (9), due to their higher density in comparison with the air. The oil then travels radially

outwardly along the discs (9) and is propelled from the discs (9) into the space (8) to eventually leave the device via the third connection (14), see

paragraph [0023]-[0024] of D2 on page 271 of Appeal and the discussion of interspace length and width within the disc stack.

Â Since the device is devised for counter-current separation and the compressor (15) has to draw air through the disc stack, a person skilled in the art

understands that the flow resistance through the disc stack has to be as low as possible. That is, the interspaces (10) between the discs (9) have to be

of comparatively large height.

In order to accelerate the air in the circumferential direction of the rotating disc stack for achieving the separation of oil from the air in such a low

flow resistance disc stack, the discs (9) must necessarily be provided with elongated spacing members extending in a generally radial direction of the

discs (9). As the skilled person realizes, otherwise, the device would not achieve the separation of oil that is set out in D2. Put differently, if the air and

oil would not be accelerated in the circumferential direction, use of a disc stack in the device of D2 would not provide any benefit.

Â Admittedly, in the paragraph [0024] of D2 on pg.

271 of Appeal, an embodiment lacking the compressor (15) and being arranged for concurrent flow of air and oil is also briefly mentioned. The only

modification of the device mentioned in connection with this embodiment is the omission of the compressor (15). Accordingly, also this embodiment

comprises a low flow resistance disc stack and therefore, must comprise elongated spacing members.

Â Further, at paragraph [0025] of D2 on pg. 271 of Appeal refers to the disclosure of point or bowl shaped or bridge shaped (elongated) distance

members/spacers (18). However, in view of the above discussed low flow resistance and need to accelerate the air in the circumferential direction,

elongated distance members are a necessity in the interspaces (10) between the discs (9) of the D2 device. The elongated distance members may be

complemented with point or bowl shaped distance members. (Note that the distance members (18) in Fig. 1 are only symbolically drawn, and that

accordingly, no conclusions with respect to the distance members can be drawn from Fig. 1.)

Â The Appellant submits that at least the feature F 1.5 of claim 1 defines that the interspaces between the separation discs at least at their radially

outer part are open for flow of the gas in the circumferential direction. In the device of D2, the interspaces (10) cannot be open for flow of gas in the

circumferential direction for the above discussed necessity of the discs (9) being provided with elongated distance members.

Â The Respondent considers cited document D2 as the closest prior art. The Respondent, in his impugned order dated June 19, 2020, seems to believe

that the crucial feature of the present invention i.e., F 1.5 â??the interspaces (27) between the separation discs (22) in at least their radially outer part

are open for flow of the gas in the circumferential directionâ? is disclosed in D2. See page 90 of the Appeal, 9th paragraph, of Respondentâ??s

impugned order dated June 19, 2020 annexed as Annexure A1.

Â The Appellant disagrees with the findings of the Respondent and humbly submits that D2 fails to disclose at least the crucial feature (F 1.5: â??the

interspaces between the separation discs in at least their radially outer part are open for flow of the gas in the circumferential directionâ?) of the

present invention. As D2 is silent on how the spacing members are arranged, and as seen in Fig-1, the spacing members (18) between the discs

appear to be distributed all the way out to the radial outer parts of the discs. Thus, the statement of the Respondent in his impugned order (Annexure

A1), i.e., â??Furthermore, the interspaces between spot-formed spacing elements are always open at their radially outer part for allowing flow of the

gas in the circumferential directionâ? is incorrect. (See for example prior art document D1 (WO0136103), in which the spacing members (26) extends

all the way out to the outer circumference of the disc, Fig-2 of D1).

Â The Appellant submits that at least the feature F 1.5 of claim 1 of the present invention is not being disclosed by D2.

Â Considering without admitting, starting from D2, at least the differentiating

feature between claim 1 of the present invention and the disclosure of D2 is feature F 1.5.

Â As discussed above, at least feature F 1.5 has the technical effect that the interspaces between the separation discs in at least their radially outer part are open for flow of gas in the circumferential direction, which at least reduces the number of inactive regions of the separation disc surfaces.

Â The Appellant humbly submits that the present invention, as recited in claim 1 and the dependent claims of the impugned application, is novel and non-obvious to a person skilled in the art over D2.

Â Cited document D3 (US5735789) concerns a centrifugal separator to cleanse a liquid of a substance dispersed therein. The separation discs of D3 include a large number of elongated obstacles (See col. 2, line 18 on pg. 277 of the Appeal).

Â The document D3 (US 5735789) clearly relates to a separator for cleaning liquid and does not relate to cleaning of gas. Thus a problem relating to how the gas behaves in concurrent gas separation cannot be solved by consulting a liquid separator of D3. Further D3 does not relate to using solely punctiform spacing members. The spacing members (27a) of D3 are clearly elongated ribs that extend far more in the radial direction. They are referred to as "elongated flow obstacles 27a". The cylindrical studs (see col. 4, line 50), are only mentioned as a complement to the flow obstacles (27a), and not that they can be used on their own. Thus, the punctiform spacing members of D3 in combination with the flow obstacles of D3 is in conflict with the aim of the present invention.

Â Further, according to D3 "the elongated flow obstacles (27a) constitute at the same time distancing elements, which keeps the separation discs at a distance from each other in the stack in a way such that pairs of discs form an interspace. Other distancing means such as cylindrical studs may, or course, be used, i.e., it is not necessary that the obstacles serve also as distancing means."

Â (D3 at col 4, lines 45-52 on pg. 278 of the Appeal). The purpose of the flow obstacles 27a is to create lee-zones, i.e., sheltered zones on the leeward sides of the obstacles. (See D3 at col. 3, lines 1-3 on pg. 278 of the Appeal).

Â It is evident from the above that D3 is in direct conflict with claim 1 of the

impugned application by requiring said obstacle (27a) on the separation discs. While “cylindrical studs” may be used in D3 (see col. 4, lines 46-58), it is respectfully submitted that the cylindrical studs would always be used in combination with the elongated flow obstacle (27a) in the radially outer zone (28a), otherwise, the object of the invention of D3 would not be achieved.

Â Hence, D3 clearly fails to disclose or teach at least the feature F 1.5 of claim 1 of the impugned application. Therefore, the present invention, as

recited in claim 1 and dependent claims of the impugned application, is novel and non-obvious to a person skilled in the art over D3.

Â Starting from cited document D2, a person skilled in the art would not be motivated to combine the teaching of D2 with the teachings of D1 or D3

to arrive at the subject matter of at least feature F

1.5 “the interspaces (27) between the separation discs (22) at least at their radially outer part are open for flow of the gas in the circumferential

direction”, which provides technical advance or technical effect that:

Â “As the interspaces (27) between the separation discs (22) in at least their radially outer part are open for flow of the gas in the circumferential

direction, the gas will flow freely in the circumferential direction and therefore not be blocked in its movement along the curved paths. Thereby the

whole surface of the separation disc is used for separation, since the free flow does not give rise to the said inactive regions on the separation disc

(22)”. (See page 18; lines 5-13 of the complete specification as filed of the impugned application).

Â The Appellant submits that it is not obvious for a person skilled in the art to arrive at the subject matter of at least feature F 1.5 and F 1.7 of present

claim 1 of the impugned application by combining the teachings of D2, or D1 and D3, either alone or collectively.

Â Upon combining D2 with D3 at least the features F 1.5 and F 1.7 of present claim 1 of the impugned application are not obvious to a person skilled

in the art. D1 utterly fails to teach or suggest at least the following features of claim 1 of IN 472:

F 1.5: the interspaces (27) between the separation discs (22) at least at their radially outer part are open for flow of the gas in the circumferential

direction.

F 1.7: the separation discs have a plurality of spot-formed spacing elements (26), which are arranged in said interspaces (27)

Â D3 does not add anything new to the teaching of D2 so as to enable a person skilled in the art, without hindsight, to arrive at least at the

aforementioned features F 1.5 and F 1.7 of the claim 1 of IN 472. Therefore, the subject matter of claim 1, particularly at least the features F 1.5

and F 1.7 are not rendered obvious to a person skilled in the art on combining D2 with D3.

Â The Respondent has also failed to establish any procedure as to how a person skilled in the art would be motivated to combine the teachings to D2

with D3 or D1 or common general knowledge or a combination thereof, to arrive at the subject matter of claim 1 of the present invention. Hence, the

subject matter of claim 1, particularly at least features F 1.5 and F 1.7 are not rendered obvious to a person skilled in the art on combining D2 with D3

(or on even combining D2 and D3 with D1 using common general knowledge).

Â The fact that, in claim 1 of the present invention, the interspaces between the separation discs that are open for flow of the gas in the

circumferential direction, which lead to the reduction in inactive regions, is regarded as a decisive technical advantage of the present invention over the

documents D1-D3.

To summarize, the Appellant submits that cited documents D1-D3, either alone or in combination, particularly a combination of D2 and D3, do not

teach or disclose or render obvious at least the following features of claim 1 of impugned application:

F 1.5: the interspaces (27) between the separation discs (22) at least at their radially outer part are open for flow of the gas in the circumferential

direction.

F 1.7: the separation discs have a plurality of spot-formed spacing elements (26), which are arranged in said interspaces (27).

Â Therefore, the Appellant submits that the subject matter of claim 1 is not rendered obvious to a person skilled in the art on combining documents

D1-D3, in particular a combination of D2 and D3.

Â The present invention provides the following technical advancement over existing art or cited documents D1-D3:

Eliminates inactive regions having no contribution towards separation process;

Improves separation efficiency of separation disc;
Improves overall efficiency of separation process;
Provides a centrifugal separator that is easy to make;
Enhanced pumping action;
Cost effective centrifugal separator

4. I have noted that the instant patent application was filed at IPO as a National Phase application arising out of PCT International Application No.

PCT/SE2009/050907. It is also reviewed that International Search Report (ISR) issued in the instant case at International stage, cited the following

five documents, mainly for lack of inventive step. It is further noted that out of these 5 documents only one document i.e. D1 shown at (i) belongs to category X ; rest all four documents were mentioned as category A. The Written Opinion of the International Searching

Authority did hold that the invention though novel but is lacking in inventive step in view of the following documents.

Authority did hold that the invention though novel but is lacking in inventive step in view of the following documents.

(i) D1-WO0220954

(ii) D2- US5637217

(iii) D3-US20030233939

(iv) D4-WO0136103 and (v) D5-US6925993

The Respondent herein, while issuance of FER in the instant application relied only on documents quoted above at sl no. (ii), (iv) and (v).

5. The applicants filed the response of the FER and the Respondent issued hearing notice, maintaining the objection of lack of inventive step.

However, this time he relied on an earlier documents shown at

(iv) above and named it as D1. The document shown at (i) which was ignored by him at the time of FER, was included this time as D2; of course not

the WO version, but its US equivalent as US 2003178014. He also cited a further document D3, US5735789 which was not cited at FER stage.

6. The International Preliminary Report on Patentability Chapter II1 considered D1-WO0220954 (US 2003178014) as most relevant prior art and

considering its features held as follows:

7. Therefore, it is amply clear that IPEA opined that even in view of document D Available at <https://patentscope.wipo.int/search/en/detail.jsf?>

docId=WO2010008342&tab=PCTDOCUMENTS&_cid=P12- KMEKFJ-83617-1
considered to be most relevant, the invention is novel and inventive.

I have no reason to disagree with the above findings as the complete specification mentions about the special configuration of interspaces between the separation discs and the preferred distance between the separation discs as well. The Respondent in the substantive examination should have taken these facts into account.

8. Though the corresponding application has been granted in various other jurisdictions considering the identical prior arts, the appellant herein wishes to further narrow down the claims by incorporating features of some subsidiary claims in the principal claim as well as specifically mentioning the height range of interspaces therein.

9. The appellant herein have further requested this Board to consider three proposed amendments of the claims as Auxiliary claims I to III wherein the claims are restrictive than the claims present on record. Out of the three proposed amendments, I consider Auxiliary Claim III, which reads as follows to be the most appropriate, to be allowed:

â??A centrifugal separator for cleaning of gas from solid or liquid particles suspended therein which are of greater density than the gas, which centrifugal separator comprises

- a rotor housing (1) which delimits a separation chamber (2) and has a gas inlet (3) to the separation chamber (2) and a gas outlet (4) from the separation chamber (2),
- a rotor (8) which by means of a driving device (9) is rotatable around a rotational axis (R) and adapted, during operation, to bring the gas into rotation in the separation chamber (2), wherein the rotor (8) comprises a stack of frustoconical separation discs (22) which are disposed coaxially with one another and concentrically with the rotational axis (R) and which by means of spacing elements (26, 30) are arranged at mutual spacing such that they delimit between them interspaces (27) for gas to flow through,
- an inlet space (25) arranged centrally in the stack of separation discs (22), which inlet space communicates with the gas inlet (3) and with a radially inner part of the interspaces (27) between the separation discs (22), and
- an annular flow space (28) which surrounds the rotor (8) and is delimited

radially by the rotor housing (1), which annular flow space communicates with a radially outer part of the interspaces (27) between the separation discs (22) and with the gas outlet (4), characterized in that

- the interspaces (27) between the separation discs (22) at least at their radially outer part are open for flow of the gas in the circumferential direction

and that mutually adjacent separation discs (22) are arranged at mutual spacing such that rotation of the rotor (8) causes in the interspaces (27) a

pumping action which drives the gas from the gas inlet (3), through the interspaces (27) between the separation discs (22) and out via the gas outlet

(4);

- wherein the separation discs have a plurality of spot-formed spacing elements (26), which are arranged in said interspaces (27);

- wherein the spacing elements (26, 30) are made integrally with the separation disc, and

- wherein the separation discs (22) are made of plastic,

- wherein the spacing elements (26, 30) are arranged axially aligned on top of each other in the stack of separation disc (22), and

- wherein a height of the interspaces (27) is of the order 0.2 mm to 0.6 mm.

10. In my considered view, I accept the Auxiliary claim III and direct the appellant to file the amended set of claims 1-9 as shown in Auxiliary claim

III to the respondent, within 3 week from the issuance of this order.

11. Therefore, I set aside the impugned order of the Respondent dated 19/06/2020 and direct the respondent to grant the patent on the amended set of claims 1-9, strictly within 3 week from the submission of amended set of claims by the respondent

12. Keeping in view the above, the instant appeal is allowed. No cost.