REPUBLIC OF SOUTH AFRICA

REPUBLIEK VAN SUID AFRIKA

PATENTS ACT, 1978

CERTIFICATE

n accordance with section 44 (1) of the Patents Act, No. 57 of 1978, it is hereby certified that:

HIVALIK COLLEGE OF ENGINEERING DEHRADUN; SHIVASHEESH KAUSHIK; DR. SATYENDRA SINGH

Has been granted a patent in respect of an invention described and claimed in complete specification deposited at the Patent Office under the number

2025/01658

copy of the complete specification is annexed, together with the relevant Form P2.

In tes y thereof, the seal of the Patent Office has been affixed at Pretoria with effect from the **25th** day of **September 2025**

.....

Registrar of Patents

FORM P1

REPUBLIC OF SOUTH AFRICA

PATENTS ACT, 1978

APPLICATION FOR A PATENT AND ACKNOWLEDGEMENT OF RECEIPT

[Section 30 (1)-Regulation 22]

The granting of a patent is hereby requested by the undermentioned applicant on the basis of the present application.

Official Application No.		
21	01	**2025/01658**

Applicant's or Agent's Reference
5004LPS

71	Full Name(s) of Applicant(s)

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Dr. Satyendra Singh
Professor, Mechanical Engineering Department, B.T.K.I.T Dwarahat, Almora, Uttarakhand – 263653, India

54	Title of invention

HEAT EXCHANGER SYSTEM WITH CLOCK WISE AND COUNTER CLOCK WISE FLOW TYPE CONCENTRIC SPIRAL TUBE

The applicant claims priority as set out on the accompanying Form P.2. The earliest priority claimed is

COUNTRY: NUMBER: DATE:

~~This application is for a patent of addition to patent application No.~~

21	01	

~~This application is a fresh application in terms of section 37 and based on Application No.~~

21	01	

This application is accompanied by:

X	1.	A single copy of a complete specification of 19 pages.
X	2.	Drawings of 3 sheet(s).
X	3.	Publication particulars and abstract(Form P8)
X	4.	A copy of a figure of the drawing (if any) for the abstract
X	5.	Assignment of invention
	6.	Certified priority document(s)
	7.	Translation(s) of the priority document(s)
	8.	Assignment of priority rights
	9.	A copy of the Form P.2 and the specification of S.A Patent Application (if applicable).
X	10.	A declaration and power of attorney on Form P3
X	11.	Statement on the use of indigenous Biological Resource, Genetic Resource, Traditional Knowledge or Use on Form P26

74	Address of Service:

SOUTH AFRICA

Dated this 24th day of February 2025

Digitally signed by :

.....

Signature of Applicant(s)

This is returned to the applicant's address for service as proof of lodging.

RECEIVED
Official Date Stamp
..... Registrar of Patents

REPUBLIC OF SOUTH AFRICA | REGISTER OF PATENTS | PATENTS ACT, 1978

Official application No.	Lodging date: Provisional	Acceptance date
21 01 **2025/01658**	22	47
International classification	Lodging date: Complete	Granted date
51 F28D	23 2025/02/24	

71 Full name(s) of applicant(s)/Patentee(s):

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71 Applicant substitued:	Date registrered

71 Assignee(s):	Date registrered

72 Full name(s) of inventor(s):

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Priority claimed:	Country	Number	Date

54 Title of invention

HEAT EXCHANGER SYSTEM WITH CLOCK WISE AND COUNTER CLOCK WISE FLOW TYPE CONCENTRIC SPIRAL TUBE

Address of applicant(s)/patentee(s):

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74 Address for service

SOUTH AFRICA
Reference No. 5004LPS

61 Patent of addition No.	Date of any change

Fresh application based on.	Date of any change

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978
COMPLETE SPECIFICATION
[Section 30(1) – Regulation 28]

OFFICIAL APPLICATION NO.		LODGING DATE	
21 01	**2025/01658**	22	2025/02/24

INTERNATIONAL CLASSIFICATION	
51	F28D

FULL NAME(S) OF APPLICANT(S)

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15. Shabaaz Khan, Scholar, Mechanical Engineering Department, Shivalik College of Engineering, Dehradun, India

TITLE OF INVENTION

54 **HEAT EXCHANGER SYSTEM WITH CLOCK WISE AND COUNTER CLOCK WISE FLOW TYPE CONCENTRIC SPIRAL TUBE**

REPUBLIC OF SOUTH AFRICA

PATENTS ACT, 1978

PUBLICATION PARTICULARS AND ABSTRACT

[Section 32(3)(a) – Regulation 2291)(g) AND 31]

OFFICIAL APPLICATION NO.		LODGING DATE		ACCEPTANCE DATE	
21	01 **2025/01658**	22	2025/02/24	47	

INTERNATIONAL CLASSIFICATION		NOT FOR PUBLICATION
51	F28D	CLASSIFIED BY:

FULL NAME(S) OF APPLICANT(S)

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EARLIEST PRIORITY CLAIMED

COUNTRY		NUMBER		DATE	
33		31		32	

TITLE OF INVENTION

54 **HEAT EXCHANGER SYSTEM WITH CLOCK WISE AND COUNTER CLOCK WISE FLOW TYPE CONCENTRIC SPIRAL TUBE**

57 **The present invention relates to a clock wise and counter clock wise flow type concentric spiral tube heat exchanger system (100). The system (100) enhances heat transfer through increased turbulence. It comprises a hollow outer pipe (102); and an inner spiral tube (106) having six spiral coils (108a-108f) arranged such** that the first, third, and fifth coils enable clockwise fluid flow, while the second, fourth, and sixth coils enable counter-clockwise flow. This alternating flow pattern induces higher turbulence compared to conventional designs, improving heat transfer rates. The system (100) incorporates micro-inserts (hemispherical, conical, helical) on the spiral tube's outer surface for further turbulence augmentation. It offers scalability for applications like solar collectors, thermal industries, electronics **cooling, and can be configured for heating or cooling by selecting the appropriate hot/cold fluid flow paths. The improved turbulence and heat transfer make it highly effective for solar energy utilization and thermal management.**

PATENT IMAGE