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(71)**Name of Applicant :**
1)Mr.S Krishnan
Address of Applicant :Associate Professor, Department of Mechanical Engineering, Dhirajlal Gandhi College of Technology, Salem 636309, Tamilnadu, India Salem ---------- ----------
2)Dr. P. Senthil Kumar
3)Mr. Kamallochan Barman
4)Ms. Bhanita Das
5)Dr. Sivakumar Ponnusamy
6)Dr. T Venkata Deepthi
7)Dr. Sudarshana Borah
Name of Applicant : NA
Address of Applicant : NA
(72)**Name of Inventor :**
1)Mr.S Krishnan
Address of Applicant :Associate Professor, Department of Mechanical Engineering, Dhirajlal Gandhi College of Technology, Salem 636309, Tamilnadu, India Salem ---------- ----------
2)Dr. P. Senthil Kumar
Address of Applicant :Professor & Head, Department of Mechanical Engineering, Dhirajlal Gandhi College of Technology, opposite Salem Airport, Salem- 636309 Salem ---------- ----------
3)Mr. Kamallochan Barman
Address of Applicant :Assistant Professor, School of Pharmaceutical Sciences, University of Science and Technology, Meghalaya- 793101 Techno City ---------- ----------
4)Ms. Bhanita Das
Address of Applicant :Assistant Professor, School of Pharmaceutical Sciences, University of Science and Technology, Meghalaya- 793101 Techno City ---------- ----------
5)Dr. Sivakumar Ponnusamy
Address of Applicant :Associate Professor, Department of Computer Science and Engineering, SRM Institute of Science and Technology, Delhi-NCR Campus, Delhi - Meerut Expy, Modinagar, Uttar Pradesh- 201204 Modinagar ---------- ----------
6)Dr. T Venkata Deepthi
Address of Applicant :Associate Professor, Department of Mechanical Engineering, Malla Reddy Engineering College-Main Campus (Autonomous), Medchal, Secunderabad, Telangana 500100 Secunderabad ---------- ----------
7)Dr. Sudarshana Borah
Address of Applicant :Assistant Professor, School of Pharmaceutical Sciences, University of Science and Technology Meghalaya-793101 Techno City ---------- ----------

(57) Abstract :
In-process and chemical industry applications, chemically inert and non-corrosive heat exchangers are required to ensure no contamination and less fouling, even though conventional heat exchangers are made of copper, aluminum, and other metallic materials are rarely useful in these applications. Although polymeric materials heat exchangers are chemically inert, they do not have the thermal capacities necessary for use as heat exchangers. The fluro-polymer heat exchangers are the only polymeric heat exchangers with even a small heat transfer capacity compared to other types. Because the geometry of a heat exchanger is so important in defining its heat transfer capacities and fouling resistance, spiral tubes in tube heat exchangers are the most compact of the heat exchangers available. At the same time, the pumping power needed is somewhat greater. This heat exchanger design has a challenging manufacturing process, and it is also tough to clean over time for routine maintenance and inspection. The issue of fouling may be addressed in the manner indicated in our proposal, namely, by the inclusion of variable pitch, which alters the form geometry of the spiral by adjusting the pitch of the conical spiral, hence preventing scaling and fouling. The design and development of a heat exchanger are heavily influenced by the geometry of the tubes used in the process. Specifically, the development of a heat exchanger in which the fluro polymer tube is wound in a spiral shape and in which hot fluid is always passed from inside to the outside of the spiral, but the path of cold fluid can be changed to achieve the parallel flow or counter flow configuration is discussed in this invention.

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