

## Patent Granted for CMTI Invention

The invention titled **Double Start Constant Flow Tapered Screw with Nonlinearly Varying Pitch** has been granted patent by the Patent Office, Govt. of India.

**Patent No: 248177**

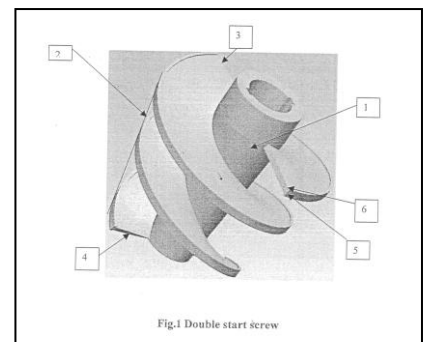
**Application Number: 749/CHE/2006**

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**Patentee: Central Manufacturing Technology Institute (CMTI)**

### Abstract:

A double start constant flow tapered screw (Fig. 1) is disclosed. The thread starts on the conical hub '1' which is of diameter  $d_1$  and ends at the other smaller end of diameter  $d_2$ . The envelop cone '2' also has its larger diameter  $D_1$  on the same side as  $d_1$  and reduces to  $D_2$  at the other end. The instantaneous starting lead is at the start of thread '3' is  $L_1$ . At the other end '4' the instantaneous lead is  $L_2$ . The second start of the thread '5' has similar data as first start with 180 degree rotational symmetry. Depending upon the values of  $D_1$ ,  $D_2$ ,  $d_1$ ,  $d_2$ , and the starting lead  $L_1$ , the length of the screw and ending lead  $L_2$  are designed through simulation to meet the constant flow requirement. By using this screw, constant flow for each degree of rotation and reduction in size of the material is achieved.



The main objective of the present invention is to provide a double start tapered screw where the hub surface and the outer envelope surfaces for the thread are conical and the volume of the material through the screw for every degree of rotation of the screw is constant, which obviates the non-availability of such a screw in the earlier inventions as detailed above.

Another objective of present invention is to reduce/increase the size of the material (cylindrical shape diameter to decrease or increase) with density of the material constant as it flows out.

Still another objective of the invention is to control the volume/density of the material as it flows, to the required value through lead variation with multi start threads and or variation of hub surface and envelop surface either conical, or any surface of revolution. Yet another objective of the present invention is to optimise the power required to drive the screw by ensuring that the volume of the material increases continuously by only +1% (from in let to out let) as it flows.

### The main advantages of the present invention are:

1. Development of a double start constant flow tapered screw along with reduction/enlargement in size of cylindrical raw material like clay.
2. Development of the concept of nonlinearly varying lead/pitch to meet the requirement of density change (or density constant).
3. Development of the concept of complex screw where all the parameters of the screw are variables, i.e., Hub surface is conical, Envelop surface is conical, the lead is continuously varied non linearly, with multi starts.