(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 033 493 A2

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
06.09.2000 Bulletin 2000/36

(21) Application number: **98964573.4**

(22) Date of filing: **24.11.1998**

(51) Int. Cl.[7]: **F04D 5/00**

(86) International application number:
PCT/RU98/00396

(87) International publication number:
WO 99/27257 (03.06.1999 Gazette 1999/22)

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

(30) Priority: **25.11.1997 RU 97120198**

(71) Applicant:
Zakrytoe Aktsionernoe Obschestvo " Novomet-Perm"
Perm 614600 (RU)

(72) Inventors:
- **RABINOVICH, Alexandr Isaakovich**
  Perm, 614010 (RU)
- **PERELMAN, Oleg Mikhailovich**
  Perm, 614090 (RU)
- **KUPRIN, Pavel Borisovich**
  Perm, 614068 (RU)
- **MELNIKOV, Mikhail Jurievich**
  Perm, 614061 (RU)
- **DOROGOKUPETS, Gennady Leonidovich**
  Perm, 614068 (RU)
- **IVANOV, Oleg Evgenievich**
  Perm, 614600 (RU)
- **TREGUBOV, Grigory Samarievich**
  Perm, 614039 (RU)
- **TRYASTSYN, Igor Pavlovich**
  Perm, 614090 (RU)
- **MELNIKOV, Denis Jurievich**
  Perm, 614101 (RU)
- **AGEEV, Sharifzhan Rakhimovich**
  Moscow, 124190 (RU)
- **GUSIN, Nikolai Vasilievich**
  Perm, 614013 (RU)
- **VYDRINA, Irina Vasilievna**
  Perm, 614025 (RU)
- **SHTENNIKOVA, Galina Alexandrovna**
  Perm, 614088 (RU)
- **SEMENOV, Jury Lvovich**
  Perm, 614111 (RU)

(74) Representative:
W.P. Thompson & Co.
Coopers Building,
Church Street
Liverpool L1 3AB (GB)

(54) STAGE IN A SUBMERGED MULTIPLE-STAGE PUMP

(57) The invention relates to oil-industry mechanical engineering and more particularly, to multistage oil-well pumps for pumping out formation fluid. The attainable technical result resides in a higher pressure head at low delivery rates and higher stability of performance characteristics when gas pockets are present in the medium being transferred. To this end, in the stage of a multistage submersible pump, having an impeller which comprises a driving disk and a driven disk with vanes interposed therebetween, and a guide vane assembly with shaped vanes whose leading edges extend beyond the outside diameter of the external lid of the guide vane assembly, triangular cells are provided at the periphery of the impeller driving disk on the lateral surface thereof, which cells are open towards the disk outer side, and a side annular channel is provided on the surface of the external lid of the guide vane assembly, which surface mates with the impeller. The surface of the lateral annular channel is spaced apart from the upper edge of the impeller cells at least 0.3 the depth of the latter, and the radial length of the cells is not in excess of 0.3 the driving disk radius.

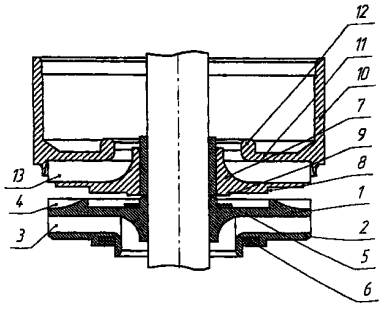

Fig.1

EP 1 033 493 A2