**Description**
The separator is designed for separation of dry powdered materials with an objective of purification of the main product from nonmagnetic, weakly magnetic, or magnetic components. The device is most effective for separation of finely disperse particles united by magnetostatic interaction into floccules and conglomerates.

High selectivity of separation is reached by using cylindrical separation chambers located on the rotor. Prismatic permanent magnets are fixed (with an angular displacement $\alpha$) on the inner and outer sides of the rotor with magnetic moments directed along the radius in forward and backward directions, respectively. As the rotor rotates, the particles of the separated product are remagnetized many times, rotate, and move inside the separation chambers. This results in intense destruction of magnetic floccules and selective separation of the products.

The separator is equipped by replaceable rotors with different structures of separation chambers and containers for separation products. It is possible to change the number of magnets (up to 45) and the angle $\alpha$ between them, as well as the rotation velocity of the rotor.

**Technical specifications**

<table>
<thead>
<tr>
<th></th>
<th>100-200 kg/h</th>
<th>0.01 – 5 mm</th>
<th>22 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency of the prototype</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of separated products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Separator weight</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Technical appraisal and economic benefits**
- Use of permanent magnets instead of electric magnets in the rotor separator;
- Low metal consumption;
- Possibility of conducting up to 29 cycles of purification with high selectivity during one separation loop;
- Reduction of the cost price of the technological process by a factor of 5-6.

**Application areas**
- Additional extraction of iron from the “tails” of magnetized ore dressing.
- Extraction of magnetic pyrites from magnetic concentrates (the content of sulfur is reduced to 0.1-0.2%).
- Extraction of finely dispersed grains of magnetite and gold from ore dressing rejects.
- Purification of powdered artificial diamonds from magnetic technological additives.

**Development stage**
A prototype of the separator has been manufactured (Kirensky Institute of Physics, Siberian Branch, Russian Academy of Sciences). Separation tests have been performed for products and ores of some deposits in Russia (in particular, Krasnoyarsk Krai) and samples of laboratory products.

**Patent situation**

**Commercial offers**
- Joint commercialization;
- License agreement;
- Know-how transfer;
- Production and procurement contract;
- Agreement on further investigations on development of separation techniques for enrichment or purification of customer’s materials;
- Joint design of industrial types of separators together with the potential manufacturer.
**Estimated cost**
Cost of laboratory studies and consultations is to be negotiated.
Cost of manufacturing of the magnetic rotor separator – 200-500 thousand rubles depending on the configuration and efficiency.

**Contacts**
Cand.Sc. Nikita V. Volkov, Scientific Secretary
Kirensky Institute of Physics, Siberian Branch of Russian Academy of Sciences,
Akademgorodok, Krasnoyarsk, 660036, Russia
Phone: (3912) 43-07-63
Fax: (3912) 43-89-23
E-mail: dir@iph.krasn.ru
http://www.kirensky.ru