Description
The modular mobile ore treatment plant (MMOTP) is intended for treatment and dressing of gold-bearing ore associated with quartz veins in small hardly accessible deposits and occurrences. MMOTP is a pioneering pilot model of a modular mobile plant of a new class. The MMOTP pilot model is used in the two-cycle technology including (i) average-size ore reduction with an inertial rotary crusher (IRC-2-1000D) followed by small-size reduction with an impact combined-action crusher (CAC-300); and (ii) counter-impact grinding on a centrifugal mill (CMCI-800) followed by dressing on the air separator mill (PS-2000). The MMOTP equipment is mounted on KamAZ-lorry chassis (model 53213, performance 0000075, load capacity 17,000 kg), with a power takeoff, a trailer, a bracing jack (similar to a lorry-mounted crane), and a hydraulic system (Fig.). The trailer, with the mounted inertial crusher operated in a secondary crushing and screening mode (-350+100 mm), works as a conveyer hopper with a fixed-bar grizzly (1), a crusher (2) and a conveyer (3). The CAC-300 crusher (4) mounted on the lorry chassis is connected with the conveyer (3) and receives the negative fixed-bar grizzly (1) product together with the inertial crusher (2) product. The crushed material CAC-300 (- 5 mm) from a collecting bin is transported by a conveyer (5) to the centrifugal mill (CMCI-800) (6) mounted on the air separator mill (PS-2000) (7). The air separator mill (PS-2000) receives air from a dust fan (8). The waste air pipe is attached to a cyclone collector (9) for trapping fine-size material.

Layout of lorry-mounted MMOTP equipment

The trailer is set up in the working position so that the screen bunker can receive the primary ore from a bulldozer or a winch. The lorry chassis with the mounted equipment are placed nearby, and the negative fixed-bar grizzly product and together with the inertial crusher product are transported by the conveyer to the loading hole of CAC-300. The power of electric unit is 100 kW. The power takeoff of the lorry allows a takeoff within 74 kW from a shaft, which requires the use of an 100 kW independent station.

Technical specifications
Type: self-contained, lorry-mounted mobile plant
Production rate: up to 6 ton ore /hr
Gold extraction: over 80%
Ore reduction: over 4 times
Maintenance personal: 3 men
Power: 100 kW
Weight: 12.5 t
The plant has no equivalents in the world practice. The existing module plants (of the type of “Karavan”) are stationary treatment plants applicable to large and medium-size deposits.

Technical appraisal and economic benefits
The most important advantages of MMOTP are:

- low power and metal consumption, which allows the equipment to be mounted on common lorry chassis;
- operation at temperatures to -40\(^\circ\) provided that special measures are taken to maintain the friability of the crushed product loaded into the air separator mill;
- no need for industrial process water;
- easy integration with existing on-site mining technologies (transport excluded);
- environmental safety;
- applicability in mineral exploration;
- lower costs of processing and dressing.

Application areas
Mining, including gold mining.

Development stage
The suggested equipment for the ore gold treatment technology was developed on the basis of design work by the North Mining Institute (Yakutsk) and the Stock Holding Company «Usolmash» (Irkutsk region). The laboratory-based technology development has been completed at the North Mining Institute, and the design for plant mounting together with design department of «Usolmash» Company is in process.

Patent situation
The plant and its components are partially protected by patents (Nos 2111055, 2111056, 2150323) and the certificate (12990) of the Russian Federation. The plant is represented by factory pilot models, test and laboratory equipment, partly based on know-how.

Commercial offers
- joined development of pilot model and marketing;
- license agreement for production of separate units of the plant.

Estimated cost
150,000 US$

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