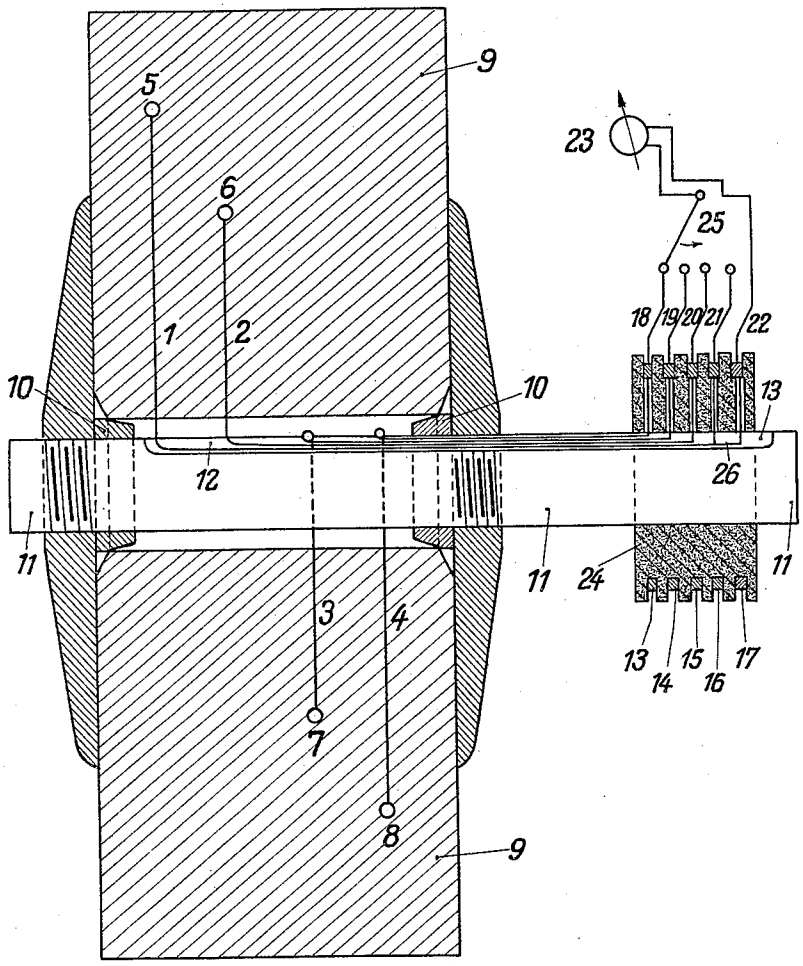
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GRINDING STONE OF CONCRETE FOR WOOD SHAVINGS

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GRINDING STONE OF CONCRETE FOR WOOD SHAVINGS

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As the grinding stones made of natural rock are seldom found in suitable composition, it has been proposed to make the grinding stones of concrete. The grinding stones of concrete do however not always give satisfaction, as they frequently explode notwithstanding the iron reinforcing commonly used. The concrete generated heat at the setting. As the outer temperature of the stone is lower than the setting temperature occurring in the stone, tension differences are produced owing to these temperature differences, said tension differences being not disturbing in statically strained concrete structures, causing however in grinding stones which are not only strained by pressure on their surface but also highly strained centrifugally, breaking off of portions or complete breaking. The tensions, which occur at the hardening of the stone, cause the production of hair fine fissures in the surface of the stone.

According to the invention a grinding stone of concrete, possessing absolute security in service, is produced if care is taken that at the setting and hardening of the concrete the temperature of the surroundings of the stone is almost equal to the temperature occurring in the interior of the stone.

With this object in view cavities are provided in the stone, in which heat measuring devices, i.e. thermo elements or thermometers, are inserted serving for the observation of the occurring temperatures. The equalization of the temperature of the room, in which the setting of the grinding stone takes place, can be carried out by supplying hot air into this room or by heating the room by stoves or heating conduits. The stone may be enclosed by an envelope preventing radiating of the heat. This envelope might be artificially maintained at a suitable temperature. The percentage of moisture in the room surrounding the grinding stone at the setting has to be regulated accordingly. When the surroundings of the grinding stone are heated, the air surrounding the grinding stone must not become too dry, as in this case the water escapes too rapidly from the stone, whereby the setting of the concrete would be unfavourably influenced.

The observation of the temperaure is important not only at the production of the grinding stones but also when the grinding stone is used, as then the following conditions exist.

By the high pressure at the pressing on of the wood to be ground and owing to the revolving speed of the grinding stone, friction temperatures of more than 100° C. occur on the grinding face. As the grinding stone must move permanently in the pulp in the grinding trough and as it is squirted off with water, the surface of the grinding stone is exposed to a strong change of temperature. Specially at the beginning of each grinding period after intervals in the operation the differences between the friction temperature on the grinding stone and the temperature of the pulp water are very considerable. When the grinder has operated for a longer time the circulating water gets hot, and the difference between the friction temperature and the temperature of the pulp water becomes less great. The friction temperature produced on the surface of the grinding stone can penetrate only slowly into the interior of the grinding stone owing to the low heat conducting capability of the grinding stone, consequently a strong heat difference exists between the surface and the interior of the grinding stone. The tensions occurring in the interior of the grinding stone, owing to these heat differences, can become so strong that they lead to destructions of the structure of the grinding stone. The danger of this destruction of the grinding stone is specially strong at the starting of the grinding after the usual interval at the end of the week.

The proceedings at the grinding, which have been described, have hitherto been scarcely heeded; one has merely measured the temperature of the wood shaving under the grinding stone and believed, that one could therefrom take conclusions for conducting the service. The connections between friction temperature on the surface of the grinding stone and interior heating of this grinding stone have not been taken into consideration. One has not succeeded to con-

trol, by observing the temperature of the wood shaving, the loading of the grinding stone in such a manner that damages or even explosions of the grinding stone could be thoroughly avoided.

By the arrangement, which will be hereinafter described, it has become possible, to observe continually also the temperature proceedings at different points of the grinding stone and to control in connection with temperature measurings of the wood shaving produced and of the squirting water the course of the grinding in such a manner, that the inconveniences leading to the bursting of the grinding stone are absolutely avoided, when some attention is paid. With this object in view thermo elements are embedded in the grinding stone at several points and distributed uniformly or in another suitable manner over the circumference and width of the stone. The temperatures existing at the different points in the grinding stone produce in the thermo elements a stronger or feebler electric current, according to the temperature, said current being transmitted by suitable devices upon a measuring instrument and indicated or continually recorded. The measuring instrument may be gauged directly in heat degrees.

The arrangement for the observation of the temperature in the grinding stone is shown by way of example in cross section in the only figure of the accompanying drawing.

The thermo elements 1, 2, 3, 4 are embedded in the mass of the grinding stone 9 at suitable points so that the solder points 5, 6, 7, 8 are turned towards the outer side of the grinding stone 9. The free ends of the thermo elements are conducted to the shaft 11 of the grinding stone. In the shaft 11 a groove or bore 12 is arranged, in which the wires of the thermo elements 1, 2, 3, 4 are conducted through the fixation disc 10 to a slip ring collector 24, which consists of as many copper rings 13, 14, 15, 16 as thermo elements are provided and of one constantan ring 17. The copper wires of the thermo elements are fixed to the copper rings 13, 14, 15 and 16 and the constantan wires of the several thermo elements are united in a lead 26 and fixed to the constantan ring 17. The temperature of the grinding stone at the solder points 6, 7, 8 generates in the thermo elements 1, 2, 3, 4 an electric current corresponding to the height of the temperature, said current being conducted to the slip rings 13, 14, 15, 16 and 17. By the brushes 18, 19, 20, 21 and 22 the current is collected from the slip rings and conducted to the measuring instrument 23.

By a rotary switch 25 the thermo elements can be individually switched in, and the temperature at any point of the grinding stone at which a thermo element is embedded can be consequently observed. It is further possible to connect the thermo elements to an instrument, which records at the same time the individual temperature of all elements. To protect the thermo elements against earthing, they are insulated on their entire length by rubber and reinforced by lead. The slip ring 7, to which the constantan wires of all elements are connected, and the brush 22 and its connections to the measuring instrument 23 consist also of constantan to avoid measuring errors.

I claim:

1. A grinding stone for grinding wood pulp, comprising in combination a concrete body having recesses in its interior and temperature measuring instruments embedded in these recesses.

2. A grinding stone for grinding wood pulp, comprising in combination a concrete body having recesses in its interior and thermo-elements inserted in the recesses.

3. A grinding stone for grinding wood pulp, comprising in combination a concrete stone body having recesses in its interior, thermo elements inserted in the recesses, a shaft carrying said body, a collector on said shaft and wires connecting said collector to said thermo-element.

4. A grinding stone for grinding wood pulp, comprising in combination a concrete stone body having recesses in its interior, thermo elements inserted in the recesses, a shaft carrying said body having a hollowed portion, a collector on said shaft and wires in the hollowed portion of said shaft connecting said collector to said thermo-element.

In testimony whereof I affix my signature.

FRITZ RÜHLEMANN.