Oct. 9, 1934. W. KOSFELD 1,976,233

GRINDING APPARATUS

Filed Oct. 28, 1929

Fig. 1

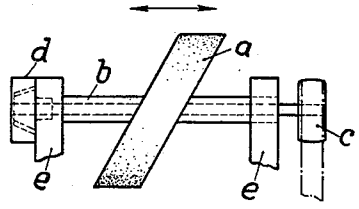
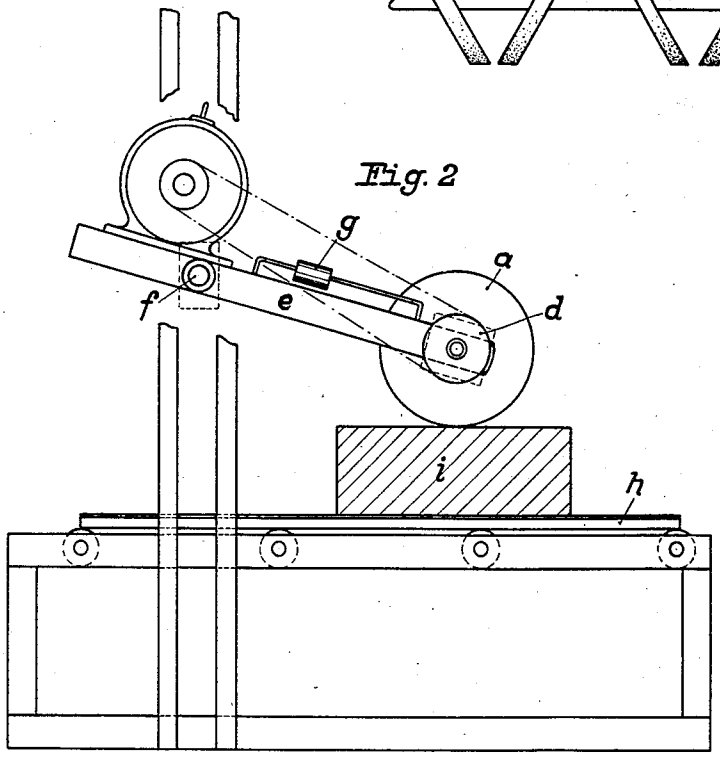


Fig. 3



Fig. 2



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Patented Oct. 9, 1934 1,976,233

UNITED STATES PATENT OFFICE

1,976,233

GRINDING APPARATUS

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Application October 28, 1929, Serial No. 402,950
In Germany November 10, 1928

2 Claims. (Cl. 51—34)

Nowadays one has proceeded to work stones of every description, particularly for the production of blast furnaces, open hearth furnaces and the like, i. e. building material of a refractory nature by a grinding operation. Soon, however, it became evident that the grinding stones used for the said purpose are for several reasons not capable of answering their purpose to a satisfactory degree, namely performing accurate and proper work with the smallest possible consumption of power and time. It is the peculiar nature of the material particularly of fire clay, dinas, silica and similar bricks that heating to high temperatures brings in its train rapid wear and clogging as well as reduced life of the grinding wheel. It is true, that an improvement may be obtained by employing an askant wheel, but even in this case no really satisfactory result will be obtained particularly in grinding stones of great hardness, since often the surface gets worn down to a wave-like contour, a fact that in many a case will not meet with objection, in all cases, however, where a particularly great accuracy is a prime desideratum, will prove a great disadvantage. Besides, the number and size of the grooves increase rapidly, so as to make necessary frequent trimming and renewing of the wheels.

According to the present invention one succeeds in removing these drawbacks in a simple manner by employing as a grinding tool an askant wheel whose surface, having the shape of a spire of a screw complete in itself, performs the work while rotating and being at the same time submitted to an additional reciprocating movement in axial direction. Tests showed the surprising result that not only an accurately ground surface had been obtained, but in some cases the power consumption had been reduced by about 50%, whereas in all cases the durability of the wheels had been considerably increased. The number and length of the transverse movements depend upon the velocity of rotation of the wheel, the feed and the material to be worked upon and may be easily ascertained by testing. In one case where silica bricks had been ground, with a feed of 570 mm. per minute and a corresponding velocity of rotation of the wheels, 110 transverse movements per minute had been executed in axial direction in using askant wheels.

Furthermore, by means of the new process a very efficient cooling of the grinding wheel is made possible which may be further enhanced by the provision of suitable suction means for removing the dust which may be easily mounted on the machine.

A further improvement may be obtained by yieldingly mounting the grinding wheel in such a way that it is capable, if only to a small extent, of being raised or lowered when striking an unexpectedly great obstruction (some particularly hard grains or spots). For this reason it will prove of advantage to use a grinding machine the grinding wheel of which is mounted on a horizontally disposed spindle.

The invention is illustrated by way of example in the accompanying drawing, in which

Figure 1 is a partial diagrammatic view of one embodiment of the new grinding machine.

Figure 2 is a side view of the same grinding machine, and

Figure 3 shows another arrangement of grinding wheels on the shaft according to Figure 1.

In Fig. 1 is shown a diagrammatic illustration of the operation of the process. *a* designates the askant wheel, a plurality of which may also be mounted on the spindle *b* in juxtaposition but in spaced relation. The driving wheel *c* imparts rotary movement to the grinding wheel whereas at the same time by means of a suitable gearing *d* the spindle is reciprocated in axial direction, as indicated by the arrows.

In Fig. 2 the spindle *b* together with the grinding wheel is rotatably mounted in a frame *e* which swivels about the horizontal axle *f* which may be weighted by adjustable poises *g* in such a way as to apply a certain amount of pressure during the grinding operation so that the grinding wheel, on striking unusual obstructions only, will be caused to yield in an upward direction and to return to its original position. It will prove of advantage to use templets in the grinding operation along which the grinding wheel will be guided. It goes without saying that for the purpose of controlling the depth of cut also other known means may be employed. In all cases *h* is the movable table which supports the work piece *i*.

A further increase of the work accomplished by the grinding machine may be obtained with the consumption of a small amount of abrasive and correspondingly reduced weight of the wheel and the machine as well as power consumption by arranging two or more inclined wheels at an angle to each other, as shown in Fig. 3.

In consequence of their transverse movement a greater or less space may be provided between the individual wheels, thus facilitating their mounting on the spindle.

Having thus described my invention what I

claim as new and desire to secure by Letters Patent is:

1. In a machine for grinding natural and artificial stones and especially burnt stones, the combination, with a rotatable shaft which may also be axially reciprocable, of a plurality of approximately flat and disk shaped grinding wheels obliquely mounted in a spaced relation upon said shaft, wherein each wheel is oppositely inclined with respect to the next adjacent wheel.

2. In a machine for grinding natural and artificial stones and especially burnt stones, the combination, with a rotatable shaft which may also be axially reciprocable, of a plurality of substantially flat grinding wheels obliquely mounted in a spaced relation upon said shaft, wherein the wheels in each pair of adjacent wheels are inclined at symmetrically opposite oblique angles while the alternate wheels are substantially parallel.

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