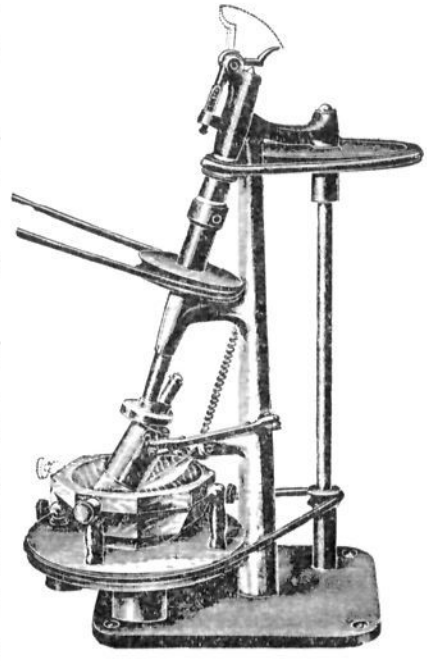
NOTES.

Power Laboratory Ore Grinder.—In such a laboratory, as that of the Edgar Thomsen Steel Works, where many ore and slag analyses are made daily, and rapid work is essential, the question of obtaining comparatively large amounts of the samples in a fine powder is an important one. It is a general rule, in ore and slag work, that the finer the sample is ground, the more rapidly and satisfactorily can the analysis be made.

In recognition of these facts, we some time ago installed in our laboratory, a small ore grinder operated by an electric motor, which, as it does the work much more satisfactorily than was possible by hand grinding, we think worthy of description for the benefit of other chemists.

The accompanying cut shows fairly well the general appearance of the grinder. It stands 18 inces high and occupies about 1 square foot of floor space. Preferably it is made of bronze and steel, heavily nickel-plated to resist the laboratory fumes. The motion is communicated to the grinder by a $\frac{1}{4}$ inch round belt running in a grooved pulley about 4 inches in diameter. Inside the hollow mandrel thus moved, is a sliding steel rod, with a groove cut lengthwise, in which a hardened steel pin, fastened to the hollow mandrel, slides.



The agate pestle is fastened to this sliding rod about 1 inch from the center and at such an angle, that in revolving, it follows closely the level of the bowl of the mortar.

The pressure is regulated by a spring pressing on the top of the sliding rod. The motion of the pestle is produced by a ball and socket joint, giving a combined rocking, rolling, and scraping motion, similar to that used in hand grinding, but on account of the rapid motion and uniform pressure, is much more efficient. In order to bring all the ore, in turn, under the

pestle, the mortar is given a slow revolving motion, while a scraper, pressing against the bowl, brings all the ore under the pestle. The mortar is held in place by four thumbscrews in four posts suitably placed to hold the sides of the mortar. One of these posts can be dropped down when the set screw is loosened, which allows the mortar to be taken out, the pestle being previously pushed up about 1½ inches. This is all done in a few minutes, it not even being necessary to stop the revolution of the pestle. The power required to operate this grinder is small and could probably be obtained from a small water motor, if electricity is not available. We have four of these grinders in daily use. Leather belts can be used for connections, but after trying several kinds we find the steel spring belt is best.

C. B. MURRAY.

EDGAR THOMSEN STEEL WORKS.

Loss of Sulphur in Preparing Ash of Plants.—It is generally known that the sulphur contained in an ash does not necessarily represent the sulphur content of the plant. Berthelot[1] states that the determination of phosphorus and sulphur when the plant is burned to an ash is often incorrect, and discusses the conditions theoretically necessary that no loss take place.[2] S. Bogdonow[3] states that the estimation of the sulphur content of a plant by determining the sulphur in the ash, is incorrect. He determines the sulphur in the plant preferably by the method of fusing it with caustic potash and potassium nitrate. Comparing his analyses of cereals made by this method with Wolf's tables of ash analyses, he concludes: (1) That the sulphur in the ash does not give even an approximate idea as to the sulphur in the plant; (2) that plants contain considerably more sulphur than has been supposed; (3) the sulphuric acid of the soil is of practical importance. It may be added that he found fertilization with sulphates advantageous to certain Russian soils.

The following experiments were made to test whether sulphur was lost on incineration of vegetable substances. No case was

[1] Compt. rend., **128**, 17.

[2] Wiley ("Principles and Practice of Agricultural Analysis," Vol. III, p. 37) states, that unless special precautions are taken, a portion of the organic sulphur and phosphorus may escape during the combustion. The method of determining sulphur in protein is described: Same volume, p. 446.

[3] J. russ. phys. chem. Ges., **31**, 471.