# A NOTE ON THE MODIFICATION OF THE FIVE-GRAM MILLING-QUALITY TEST AND THE FIVE-GRAM MICROMILL[1]

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## ABSTRACT

Elimination of the bran-weighing procedure and equipping a 5-gram micromill with a detachable hopper resulted in a 200% increase in the number of samples that can be evaluated for milling quality in a day, and significantly reduced operator fatigue.

The micromill used in Seeborg and Barmore's (1) micromilling test consisted of two breaks followed by a sifter with a No. 38 wire screen. The material remaining on this screen after milling and sifting was mainly bran and attached endosperm.

Visual comparison of this bran with that from varieties whose milling characteristics were well known showed that varieties with high flour yield, low flour ash content, rapid bolting properties, etc., had less endosperm attached to the bran than varieties with poor milling properties. Such good milling varieties generally yielded less than 1.65 g. of bran from 5 g. of grain.

While the majority of plant breeders' samples could be evaluated by the bran weighing procedure, there were always some exceptions such as: low bran weight but unacceptable cleanup, and acceptable cleanup but high bran weight.

These exceptions were attributed to the following cumulative factors:

1) Varietal differences in the fracturing the endosperm underwent in milling, which was reflected in the varying amount of coarse, chunky endosperm remaining on the No. 38 wire sieve with the bran. (A coarser sieve was not used because an undesirable amount of bran would pass into the endosperm used for micro flour quality tests.)
2) Varietal differences in the fracturing the bran underwent in milling, which was reflected in the varying amount of bran passing through the No. 38 wire sieve.

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3) Moisture levels above 9% in the untempered wheat could contribute to low bran weight, even though the bran cleanup was unacceptable.

Visual evaluation of the bran cleanup was, therefore, necessary to eliminate the breeding material with undesirable milling characteristics; moreover, it was considerably faster. This procedure has proved very satisfactory to the cooperating wheat breeders.

Elimination of the bran weighing has reduced the over-all time for the milling cycle by one-half and doubled the number of samples that can be analyzed in a day.

With the original feed hoppers (2) it was necessary to stop the micromill in order to load a new set of samples, because there was no valve to stop the grain from flowing into the rolls from the hoppers. The two operators were idle during the time that the rolls were operating, and this constituted one-half of the total milling time. Inasmuch as there was sufficient time to load a new set of samples into the hoppers, it became apparent that the total milling time could be reduced by one-half if some way could be devised to do this while the rolls were in operation.

This need led to the design and construction of a detachable hopper (Figs. 1 and 2) equipped with a slide valve which is held closed

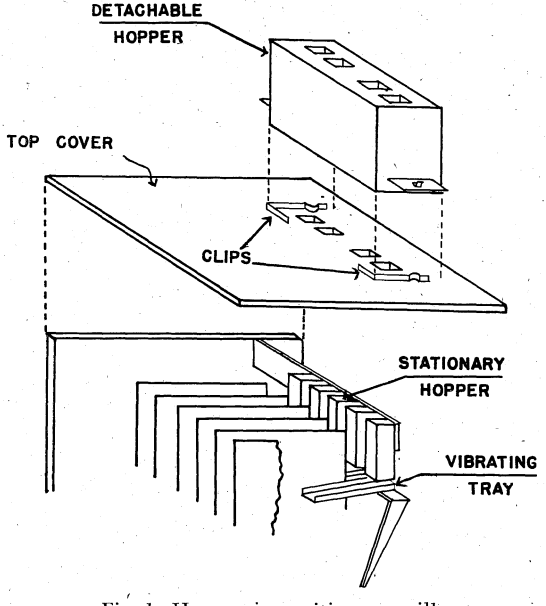


Fig. 1. Hopper in position on mill.

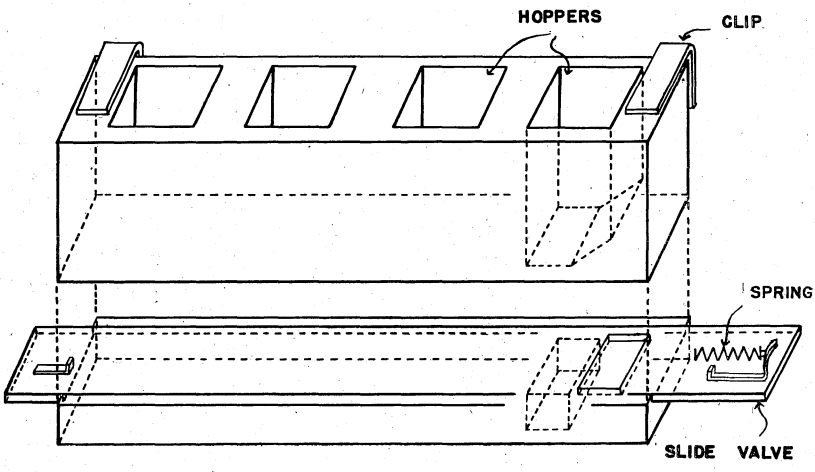


Fig. 2. Detachable hopper.

by a compression spring. The hopper is loaded with a new set of samples and clipped into position on the top cover of the mill above the stationary hoppers while samples are still going through the breaking operations. When a new milling cycle is started, all four compartments of the detachable hopper are emptied quickly and simultaneously by pushing the slide valve to the open position. The spring then closes the valve.

This new hopper, together with the elimination of bran weighing, has increased the testing capacity of the micromill 200%. In addition, it has significantly reduced operator fatigue, since the operator can remain seated during the entire operation instead of having to change from a sitting to a standing position several hundred times a day.

### Literature Cited

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2. SHOUP, N. H., PELL, K. L., SEEBORG, E. F., and BARMORE, M. A. A new micromill for preliminary milling-quality tests of wheat. Cereal Chem. 34: 296–298 (1957).