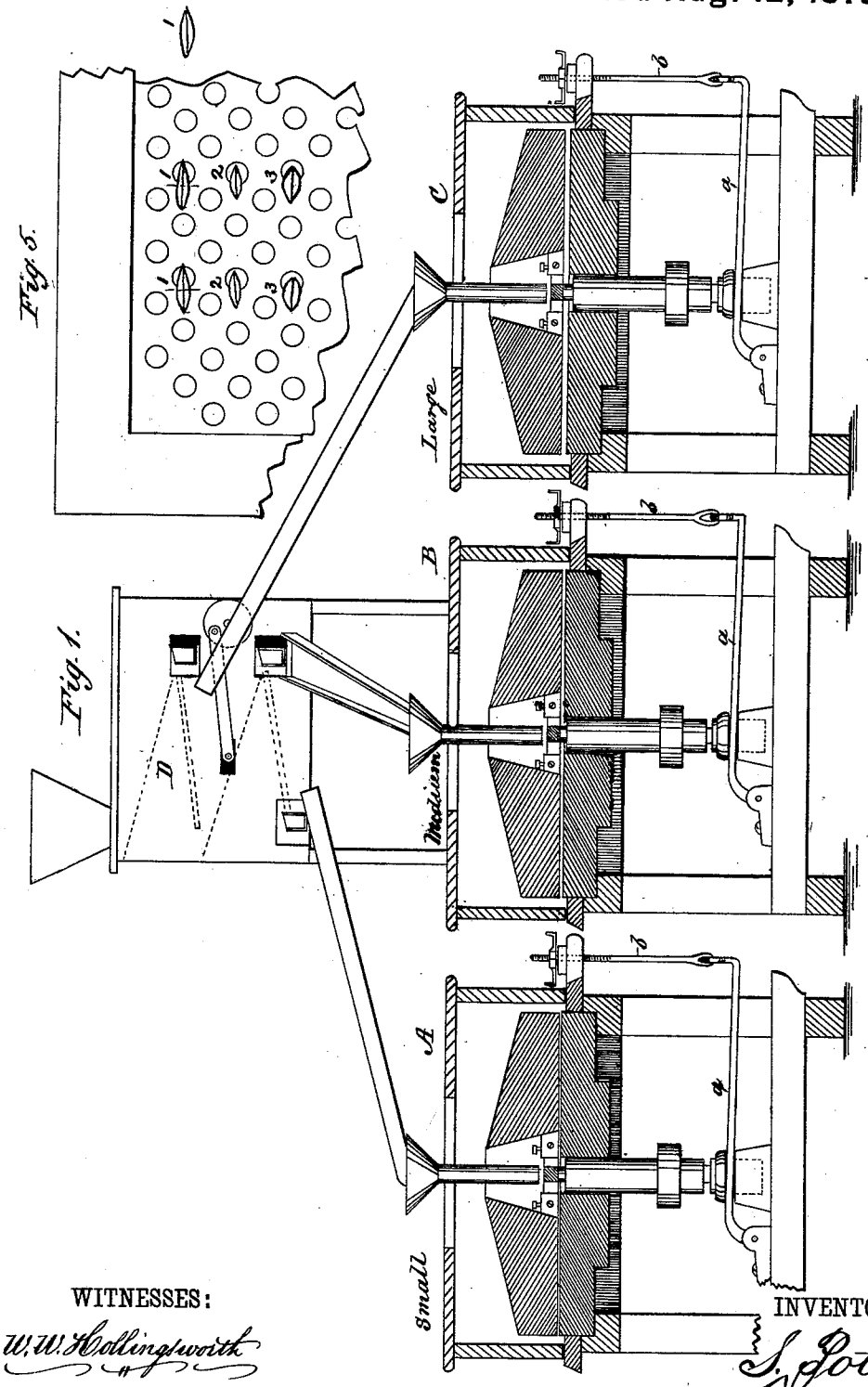
2 Sheets—Sheet 1.

S. POTTS.

Process of Preparing Grain for After-Milling.

No. 218,571. **Patented Aug. 12, 1879.**



WITNESSES:

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Fig. 4.

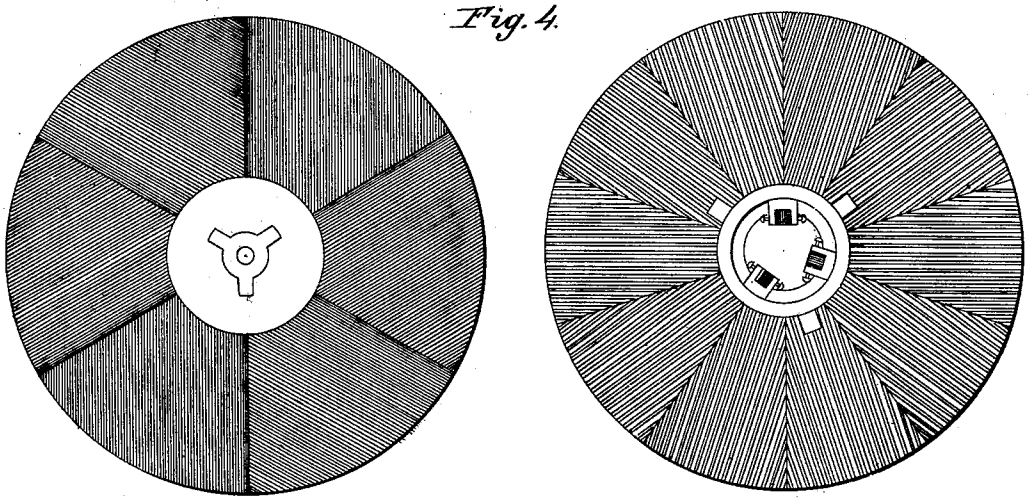


Fig. 3.

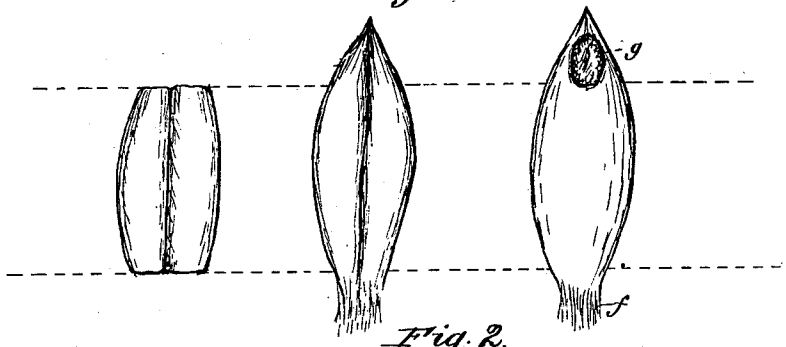
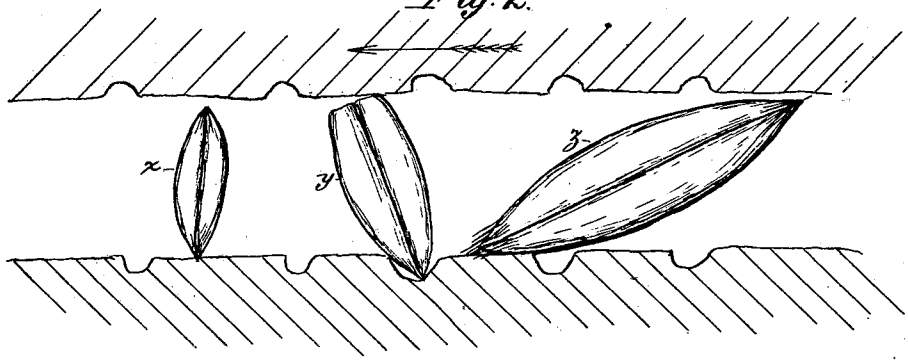


Fig. 2.



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UNITED STATES PATENT OFFICE.

SAMUEL POTTS, OF MINNEAPOLIS, MINNESOTA.

IMPROVEMENT IN PROCESSES OF PREPARING GRAIN FOR AFTER-MILLING.

Specification forming part of Letters Patent No. **218,571**, dated August 12, 1879; application filed May 29, 1879.

To all whom it may concern:

Be it known that I, SAMUEL POTTS, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new and Improved Process of Preparing Wheat for After-Milling; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation, partly in section, of the apparatus employed in carrying out my process. Fig. 2 is a view illustrating the action of the stones upon three different lengths of grain. Fig. 3 are views of the grain, showing the portions of the same removed by my process. Fig. 4 shows on the left a face view of the bed-stone, and on the right a face view of the runner. Fig. 5 is a broken view of a portion of a sieve, showing the adaptation of the same to grading grain into uniform lengths before treating the same in the mill.

My invention consists in an improved process for removing the germ and fuzzy or woody fibers found upon the ends of wheat and other similar grains before reducing the grain to flour, for the purpose of obtaining a better quality of flour than heretofore.

In carrying out the invention the grain is first graded to uniform lengths by means of a grader, D, having sieves, as shown in Fig. 5, specially adapted to grading grain as to length irrespective of size. These sieves are formed of sheet metal perforated with round holes, which holes are regulated as to size in proportion to the lengths the grain is to be separated into. Thus, if the long grains 1 1 in Fig. 5 are to be taken out as one grade, the screen which takes them out has its holes so relatively proportioned to said long grains that the diameter of the holes is a little less than half the major axis of the long grain. The long grains 1 1 will then not tilt through the holes, but will span the same, and when the sieve is reciprocated will pass over the end of the same to form the first or longest grade. While these long grains are thus eliminated, the shorter grains will pass through the holes, no matter whether these grains are short and slim, as 2 2, which have less weight than 1 1, or whether these grains are short and thick, as 3 3, which may be of greater weight than 1 1, both the shorter grains 2 and 3 passing through the holes, because the diameters of said holes are greater than half the major axis of said grain, which allows the said short grains to tilt through. The mixed grains that pass through the first sieve fall upon a lower sieve having smaller holes, and are divided into shorter lengths on the same principle.

As the grain leaves the grader it passes to the several run of stones A B C, which equal in number the number of graded lengths of grain. The grain of any one length then passes between the grinding-surfaces of stone or other suitable material having a dress of fine grooves or holes, which are of much less size than the ordinary furrows, being only large enough to receive about one-fourth of the length of a grain of wheat, so as to hold the grain while it is being up-ended by the runner-stone. The lower stone has a slightly finer dress and is fixed, while the upper stone is fitted to revolve upon the lower stone by a rigid driver, the stones being separated a proper distance by the adjusting mechanism *a b*, which distance should always be greater than the width of the grain and less than the length of the grain. In this operation the grain will at first lie flat on the bed-stone. As soon, however, as a sufficient velocity of the running stone has been attained, the draft of air caused thereby will lift or up-end the grain, and its lower end being held in one of the holes, cracks, or grooves in the bed-stone, the upper stone will grind or break off the top of the grain, at the same time tumbling the grain over and allowing its other and now lighter end to be lifted by the draft and ground off. The grain being then too small to be further acted upon is carried out from between the stones. This operation cuts off cleanly both ends of the grain, as shown in Fig. 3, and yet does not break up or cut through the bran of the remaining portion of the grain. The operation also separates the germ *g*, or life-giving principle of the grain, in a substantially unbroken state, so that it may be easily removed from the grain before after-milling or flouring.

By the described process I obtain the following advantages:

First. I render it practicable to totally exhaust the flour-producing portion of the kernel in the after-milling by making only one kind of bran and one kind of flour, instead of four, as heretofore.

Second. I render it practicable to free the "third" or "fine" flour and the "fourth" or "middlings" flour from all black specks, which cannot be done when the fuzz is ground with the flour-producing portion of the kernel.

Third. The fuzzy particles *f* or fibers being removed from the grain before flouring, there is no black flour known as "red dog" produced.

Fourth. By entirely removing the germ before reducing the grain to flour, I prevent the saffron coloration of the fourth or middlings flour, and prevent all flours, in proportion as the germ enters into their composition, from having the quality of stickiness, usually attributed to the presence of germinated grain, and also prevent fermentation of the flour.

Fifth. The after-milling or flouring operation is more easily accomplished, for the reason that there is nothing to bolt or separate from the flour except the bran, which, when the grain is first prepared by my process, separates from the grain in large scales.

I am aware that previous to grinding grain has been passed through machines containing brushes, to remove the grit, dirt, and other impurities that may have adhered to the grain. This process, however, did nothing more than clean the grain, and could not separate the germ unless it had sprouted, nor remove any part of the grain that did not project considerably from the same.

I am also aware that it has been attempted to remove the germ by splitting the grain lengthwise; but it is obvious that this does not remove the woody and fuzzy ends, as in my case, in which said parts are actually cut off.

I am also further aware that grain has been cleaned by a rolling action between two stones having substantially the same dress which I use, and in which the grain is made to revolve upon its two axes, as set forth in the Patent to Ager, September 5, 1854, and the English Patent No. 1,216 of 1854. In such cases, however, the following conditions are lacking, which are essential to my process:

First. The grain was not graded. Now as the stones are set an invariable distance apart, I have found that when adjusted for the average size grain *y*, (see Fig. 3,) if the grains are of varying length, the short grain *x* will not be touched, while the long ones, *z*, will possess such length that the angle of their longitudinal axes to the faces of the stone is too small to permit the stones to catch on the ends of the grain to grind the same off, and they simply roll on their longitudinal axes without being up-ended. The result is, that the longest and shortest grains will not have their ends ground off, and the longest, if possessing much transverse dimension, will be burst and partially ground. By grading the grain as to length, and adjusting each run of stone to that grade, all of the wheat may be successfully treated in one operation. I, of course, do not claim the grading of the grain, broadly, for milling purposes; but this grading has in connection with the other step a special coaction.

Second. Another distinction with respect to the patent mentioned is, that it does not describe a rigid driver. Now as the perfect result can only be attained with an unvarying distance between the stones for a single grade of wheat, a rigid driver is necessary, because if the stone were free to oscillate it would wabble to some extent, or get out of tram, which would cause some of the grains of wheat to be floured, while others would be imperfectly treated.

Third. Another distinction is, the patent to Ager does not specify any relative distance apart of the stones, as compared to the length or width of grain, but only a general rolling of the grain on its two axes. This would not remove the germ and fuzz unless the conditions of my process were observed, and while it might not remove the germ and fuzz, it might cut through the bran on the side of the grain, and make it so thin as to cause it to grind up fine, and be difficult to separate from the flour, while my process, with the stones set wider apart than the width of the grain, never breaks the bran on the side, and allows it in after-milling to separate in large and easily-removable scales.

I would also disclaim in this application any apparatus shown in the patent granted to me, with Arvid Parson, April 1, 1879. Such apparatus was designed to secure the same operation of ending the grain, but did not provide for the grading of the same, which is a necessary element of my process.

Having thus described my invention, what I claim as new is—

The process herein described of removing the germ ends and fuzz ends of grain-kernels previous to the final reduction of the same to middlings and flour, which consists in separating the grain-kernels into grades of uniform length, and treating said grades in a continuous operation in separate mills, having each a stationary roughened surface and an opposing revolving roughened surface, the said surfaces being rigidly adjusted with respect to each other at a distance apart which is invariable, and greater than the lateral axis of the grain-kernels, and less than their longitudinal axis, as set forth.

SAMUEL POTTS.

Witnesses:
EDWD. W. BYRN,
CHAS. A. PETTIT.