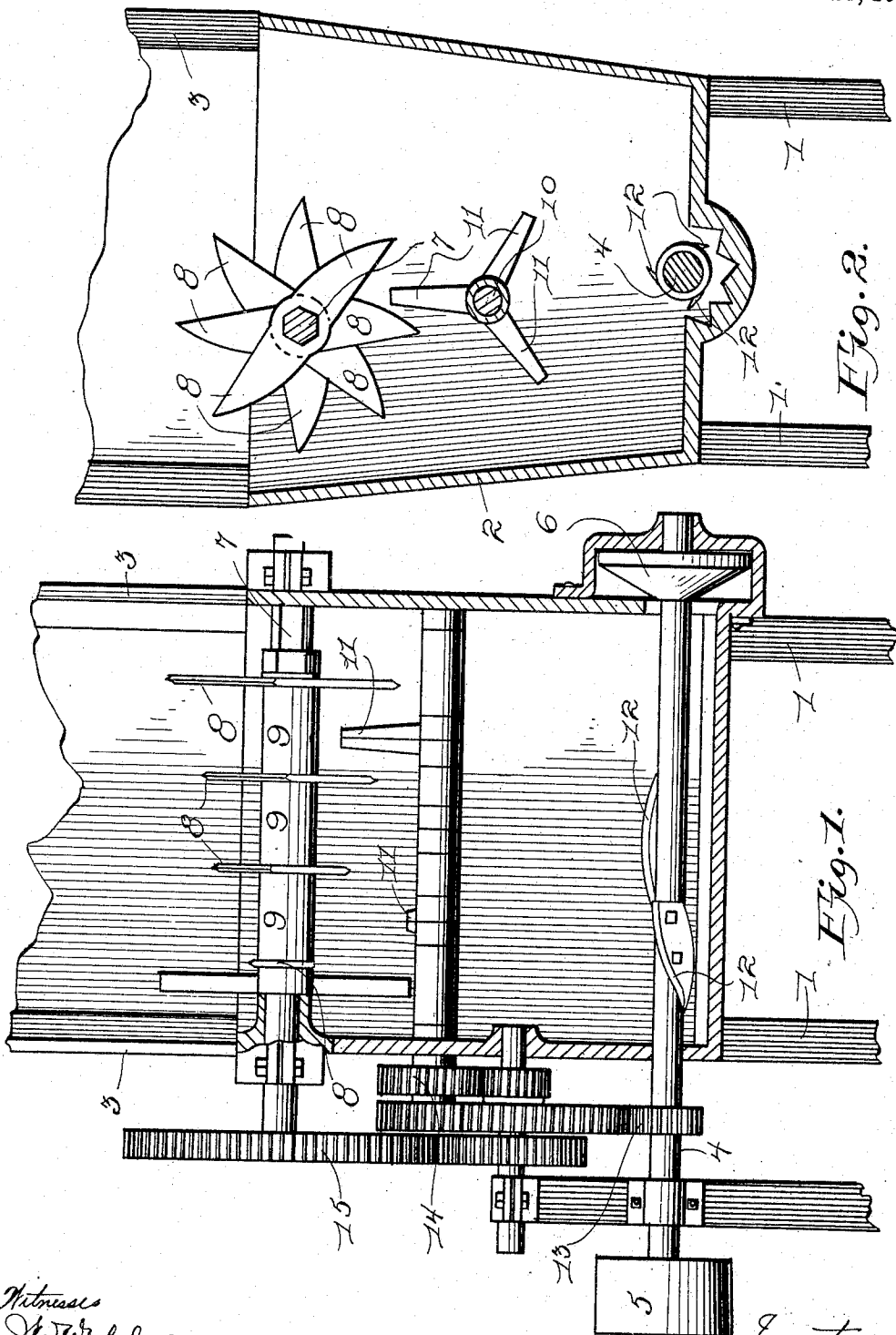


J. C. BOWSHER,
GRINDING MILL.
APPLICATION FILED AUG. 4, 1909.

947,275.

Patented Jan. 25, 1910.



Witnesses
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UNITED STATES PATENT OFFICE.

JAY C. BOWSHER, OF SOUTH BEND, INDIANA.

GRINDING-MILL.

947,275.

Specification of Letters Patent. Patented Jan. 25, 1910.

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To all whom it may concern:

Be it known that I, JAY C. BOWSHER, citizen of the United States, residing at South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Grinding-Mills, of which the following is a specification.

This invention relates to certain new and useful improvements in grinding mills and more especially to mills for grinding Kafir corn. It is well known in harvesting this grain that the heads are cut with considerable of the stalk which, when dry, is very hard and tough, the head consisting of a much branched loose structure having a hard stalk and bearing each grain on its own filament. To reduce this material to a condition of fragmentary fineness, necessary for the proper action of the grinding cone in order that it may be reduced to meal, requires a special construction and arrangement of comminuting elements which forms the subject-matter of this application.

The present invention has for its objects among others to provide a simple yet efficient device for the proper treatment of this material, by which the heads and stalks are chopped and broken into small fragments, and then, by fingers or the like, are forced downward to spiral cutting knives or blades, by which the material is still further reduced and by which such reduced material is conveyed to the grinding cone, by which it is reduced to the proper degree of fineness to produce a meal suitable for the feeding of stock.

Other objects and advantages of the invention will hereinafter appear and the novel features thereof will be particularly pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the numerals of reference marked thereon, form a part of this invention, and in which—

Figure 1 is a substantially central vertical longitudinal section through the improved mill. Fig. 2 is a vertical transverse section taken at right angles to Fig. 1.

Like numerals of reference indicate like parts in the different views.

Referring to the drawings, 1 designates the supporting members of the mill upon which rests the casing 2, of any preferred

form of construction, and within which the operating parts are disposed.

3 is a hopper into which the material is fed for proper operation by the knives and other mechanism of the mill. This may be supported in any of the well known ways, but, as this invention in no wise pertains to the form of hopper or its means of support, further illustration and description thereof are not deemed necessary.

4 is the main or driving shaft provided with the driving pulley 5 at one end and upon the other end with the usual grinding cone 6. This shaft is mounted in suitable bearings in or upon the opposite walls of the receptacle 2 or supported from the base member 1, said shaft being designed to be driven from any suitable source of power, not shown.

7 is a shaft suitably journaled and upon this shaft are the cutting knives 8 disposed at different angles upon the said shaft throughout its length, as seen best in Fig. 2, said knives being spaced apart by ferrules or collars 9 upon the shaft between the knives, as seen clearly in Fig. 1.

10 is another shaft suitably journaled in the walls of the receptacle, or otherwise, at a point below and out of the vertical plane of the shaft 7, as seen best in Fig. 2. This shaft carries a series of breaking fingers 11 disposed thereon at different angles, as seen clearly in Fig. 2, so as to interact with the cutting knives, it being understood that the knives are arranged so as to cut between the breaking fingers, as will be evident from Fig. 1.

The driving shaft 4 is suitably journaled near the bottom of the receptacle 2 and, out of alinement with the shaft 10, as will be readily understood upon reference to Fig. 2. Upon this shaft are a series of spiral cutting and feeding knives 12 which serve, not only to chop or cut the material after it has been acted upon by the knives and breaking fingers, but also to feed the said material to the cone 6.

The shafts 7 and 10 may be revolved in any suitable manner. In the present instance, I have shown them as driven by gearing 13, 14, 15 etc., from the driving shaft 4. It is evident, however, that other forms of gearing or other means for actuating the shafts may be employed without

materially affecting or altering the relative arrangement of the knives, breaking fingers and spirally disposed cutters or without affecting their operation.

5 The mode of operation will be apparent, and, briefly stated, is as follows:—The heads and stalks are fed into the mill through the hopper and the long spirally arranged cutting knives 8 first catch this material and
10 reduce the stalks to short pieces, and, at the same time, these knives serve to carry such pieces down to the action of the breaking fingers 11, which force the chopped or partially comminuted material down to the
15 spiral cutting knives or blades 12 near the bottom of the receptacle, which knives or blades, acting upon the material, further reduce the same, and, at the same time, convey it along the shaft 4 to the grinding
20 cone proper, by which it is reduced to meal of the required degree of fineness. It will be observed that the cutting knives 8 and the breaking fingers 11, interacting as they do, coact to affect the first reduction to some
25 extent after the loose heads have been slashed by the knives, as the material is thrown into the hopper. The breaking fingers serve, in a measure, as abutments against which the material is held while
30 being acted upon by the knives and then act to force the partially communicated material down to the action of the knives 12.

The apparatus, as above described, will be found most efficient for the successful
35 operation upon the particular kind of material for which it is adapted, and, while the structural embodiment of the invention, as heretofore disclosed, is what I at the present time consider preferable, it is evident that
40 the same is subject to changes, variations and modifications in detail, proportion of parts etc., without departing from the spirit of the invention or sacrificing any of its advantages. I, therefore, do not wish
45 to be restricted to the particular construction, proportion of parts etc., as hereinbefore set forth, but reserve the right to make such changes, variations and modifications as come properly within the scope of the
50 protection prayed.

What is claimed as new is:—

1. In a grinding mill, for the purpose described, the combination of a revoluble shaft, spirally disposed cutters thereon, a revoluble shaft below the cutter shaft and
55 out of alinement therewith, spirally arranged breaking fingers thereon, and a combined spiral cutter and conveyer beneath the breaking fingers and gearing common to all of said devices. 60

2. In a grinding mill for the purpose described, the combination of a revoluble shaft, spirally disposed cutters thereon, a revoluble shaft below the cutter shaft, spirally arranged breaking fingers thereon, said breaking fingers and knives being dis-
65 posed to interact, and a combined spiral cutter and conveyer beneath the breaking fingers and gearing common to all of said devices. 70

3. In a grinding mill for the purpose described, the combination of a revoluble shaft, spirally disposed cutters thereon, a revoluble shaft below the cutter shaft, spirally arranged breaking fingers thereon, and a combined spiral cutter and conveyer
75 beneath the breaking fingers and gearing common to all of said devices, the shaft carrying the breaking fingers being out of vertical alinement with the other shafts. 80

4. In a grinding mill for the purpose described, the combination of a revoluble shaft, spirally disposed cutters thereon, a revoluble shaft below the cutter shaft, spirally arranged breaking fingers thereon, and a com-
85 bined spiral cutter and conveyer beneath the breaking fingers, gearing connecting the said shafts and the shaft of said combined cutter and conveyer, the said knives and break-
90 ing fingers being relatively long and overlapping whereby said fingers serve as abutments for the material while being acted upon by the cutters.

In testimony whereof I affix my signature, in presence of two witnesses.

JAY C. BOWSHER.

Witnesses:

EDW. F. DUBAIL,
LAURA A. GOWER.