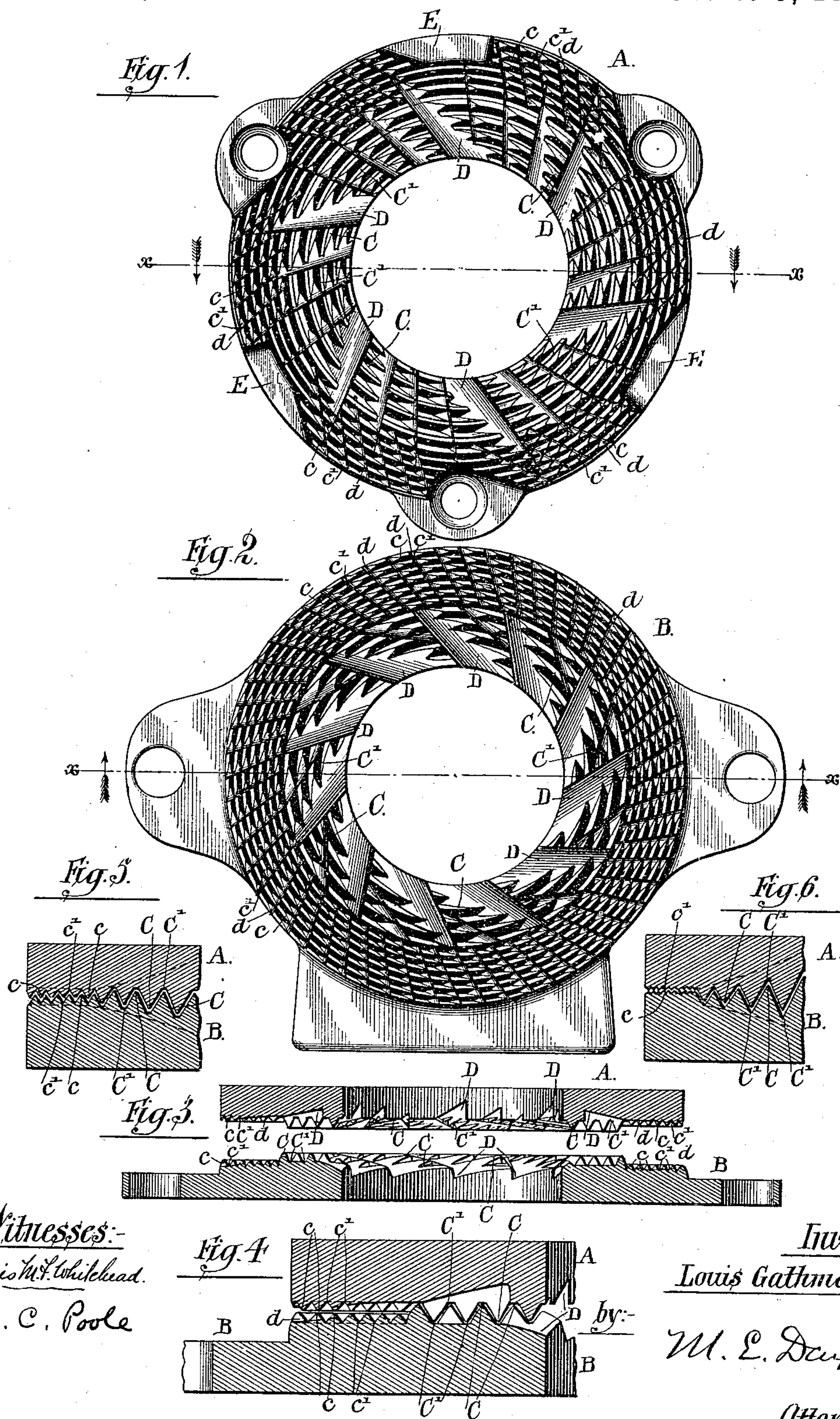


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N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

LOUIS GATHMANN, OF CHICAGO, ILLINOIS.

GRINDING-MILL FOR REDUCING GRAIN, &c.

SPECIFICATION forming part of Letters Patent No. 329,729, dated November 3, 1885.

Application filed July 3, 1885. Serial No. 170,596. (No model.)

To all whom it may concern:

Be it known that I, LOUIS GATHMANN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grinding-Mills for Reducing Grain and other Materials; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates, generally, to the construction of that form of grinding-disks for reducing grain which have annular grinding-faces and central feed. It is more particularly intended to be applied to so-called "feed-mills," in which the grinding disks or plates are chilled cast-iron, and in which the entire reduction proposed is accomplished by passing the grain once through the mill as distinguished from "gradual reduction" as performed in flour-milling, in which the grain is passed successively through several mills or operations of grinding. In mills of this class the inner margins of the opposing disks are commonly provided with deep radial or inclined furrows, which lessen in depth as they pass outward, said furrows being separated by prominences or ribs, which usually rise to or nearly to the level of the outer working-faces. These furrows and ribs serve to conduct the grain outward to the more level marginal parts of the disk, where almost the entire work of the reduction is performed. It is, however, contemplated in such former construction that the grain will to some extent be caught between the said high radial ribs of one plate and those of the other, and so be first coarsely broken before it reaches the outer and more finely-furrowed regions of the disk-faces. In the nature of the case but little grain is in fact so broken by the high ribs spoken of, with the result, as stated, that the work of reduction is largely effected in a narrow area of the working-faces of the disk.

It is one object of this invention to increase the reducing action of the inner parts of the disks while also providing for proper outward feed of the grain, and to thereby distribute the work more uniformly, and thus increase the capacity and durability of the plates.

It is another object of the invention to avoid clogging of the mill in the outer regions of the disk-faces, whereby its capacity and efficiency are still further increased.

Other objects or advantages and the manner of their attainment will fully appear from the following description of one embodiment of my invention, which is illustrated in the accompanying drawings.

In said drawings, Figure 1 is a plan view of the working-face of a disk—say the runner-disk—prepared in accordance with my invention. Fig. 2 is a similar view of the working-face of the opposing disk when both disks correspond. Fig. 3 shows opposing similar disks in central transverse section—say in the line X X of Fig. 2—but more widely separated from each other, obviously, than when they are in working position. Figs. 4, 5, and 6 are sectional fragmentary views of opposing similar disks in a working position and enlarged.

A is, say, the runner, and B is the opposing and commonly stationary disk.

C C are a series of concentric annular V-shaped ribs on the inner portion of the face of each disk, which alternate with corresponding ribs on the opposing disk, so that when the disks are brought into proximity the said ribs of one disk enter the opposite and similarly-shaped grooves C' of the other. Exterior to these interfitting ribs and grooves C C', and upon each disk, is a series of other annular V-shaped ribs, c, and intervening grooves c', which are both narrower and more shallow than the inner ribs, C, and grooves C'. I prefer that the outer ribs, c, of one disk shall oppose the corresponding grooves of the opposite disk, as shown in Figs. 5 and 6; but it will be within my invention if they shall stand to each other in the relation shown in Fig. 4, because said outer ribs and grooves are so small that it is not material.

It is a characteristic of my invention that the apices of the outer series of ribs, c, or other form of dress there employed, will be lower than that of the apices of the inner ribs, C, at least upon one disk, and I prefer that the difference in elevation shall be substantially the same, or nearly so, in both disks, as shown in Fig. 6. In operation the opposite disks

will proximate each other, as may be required, for different qualities of work, as in the case of other forms of dress.

D D are inner tapering feed-furrows formed on a suitable draft, preferably in each disk, and having their advanced faces (reference being had to the direction of motion) perpendicular to the disk-face, or proximately so, and their rear faces inclined. These feed-furrows extend across and cut the inner ribs and grooves, C and C'. They may be all of one size or of different sizes, as preferred. Traversing the outer ribs and grooves, c c', are other furrows, d, having similar abrupt front and inclined rear faces, but smaller than D, and preferably of the same depth as the annular grooves which they intersect. These feed-furrows D d cut the ribs C c into short sections having V-shaped abrupt ends. By reason of the intercurrent arrangement of the ribs and grooves C and C' it is evident that the grain passing outward from the central feed opening or eye of the disk or disks through the feed-furrows D will be caught between the abrupt ends of the ribs C of the opposing-disks, and will be cut or broken into fragments. These fragments or the larger of them will be carried along in the grooves C' till they reach the next feed-furrow, where they will be released, and be forced farther outward, to be again caught and again reduced in the same way as before. Reaching the furrows d, they are further cut and reduced between the opposing abrupt ends of the ribs c, and are swept along in the grooves till they reach other feed-furrows, and so pass finally from between the disks. To favor the prompt discharge of the ground product, recesses E E are desirably provided at intervals about the margin of the runner-disk A, at which recesses the outermost grooves c' terminate and discharge. By reason of the intersecting arrangement of the feed-furrows d and grooves c' some part of the material will tend to pass out through the furrows, while other parts will pass along the grooves, and this separation of the parts prevents massing and clogging of such material in either class of

passages. The recesses E still further favor this result by affording prompt discharge of the material at these points.

It is to be understood that the construction of the interfitting ribs C and grooves C', intersected by the inner feed-furrows, D, may be employed with any suitable form of exterior dress in place of the ribs and grooves c c', and, generally, in speaking of or providing for more than one advantage as the object or purpose of my invention, I desire it to be understood that such modifications of the devices described as shall attain one or more but less than all the results obtainable from my improvements, as set forth, shall not be regarded as departures from my invention.

I claim as my invention—

1. Two opposing grinding-disks provided with series of interfitting concentric ribs and grooves upon the inner portions of their working-faces intersected by tapering feed-furrows, and upon the outer portions of their faces with smaller and less elevated concentric ribs and grooves, also intersected by feed-furrows, substantially as described.

2. In a pair of opposing grinding-disks, a form of dress comprising a series of inner ribs, C, and grooves C', intersected upon one of the disks by suitable deep feed-furrows, as D, the apices of the said inner ribs on one of the disks being more elevated than the outer dress of the disk, substantially as described.

3. In a pair of opposing grinding-disks, a form of dress comprising a series of inner ribs, C, and grooves C', intersected upon one of the disks by suitable deep furrows, as D, the apices of the said inner ribs on both of the disks being more elevated than the outer dress of the disks, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

LOUIS GATHMANN.

Witnesses:

M. E. DAYTON,
C. CLARENCE POOLE.