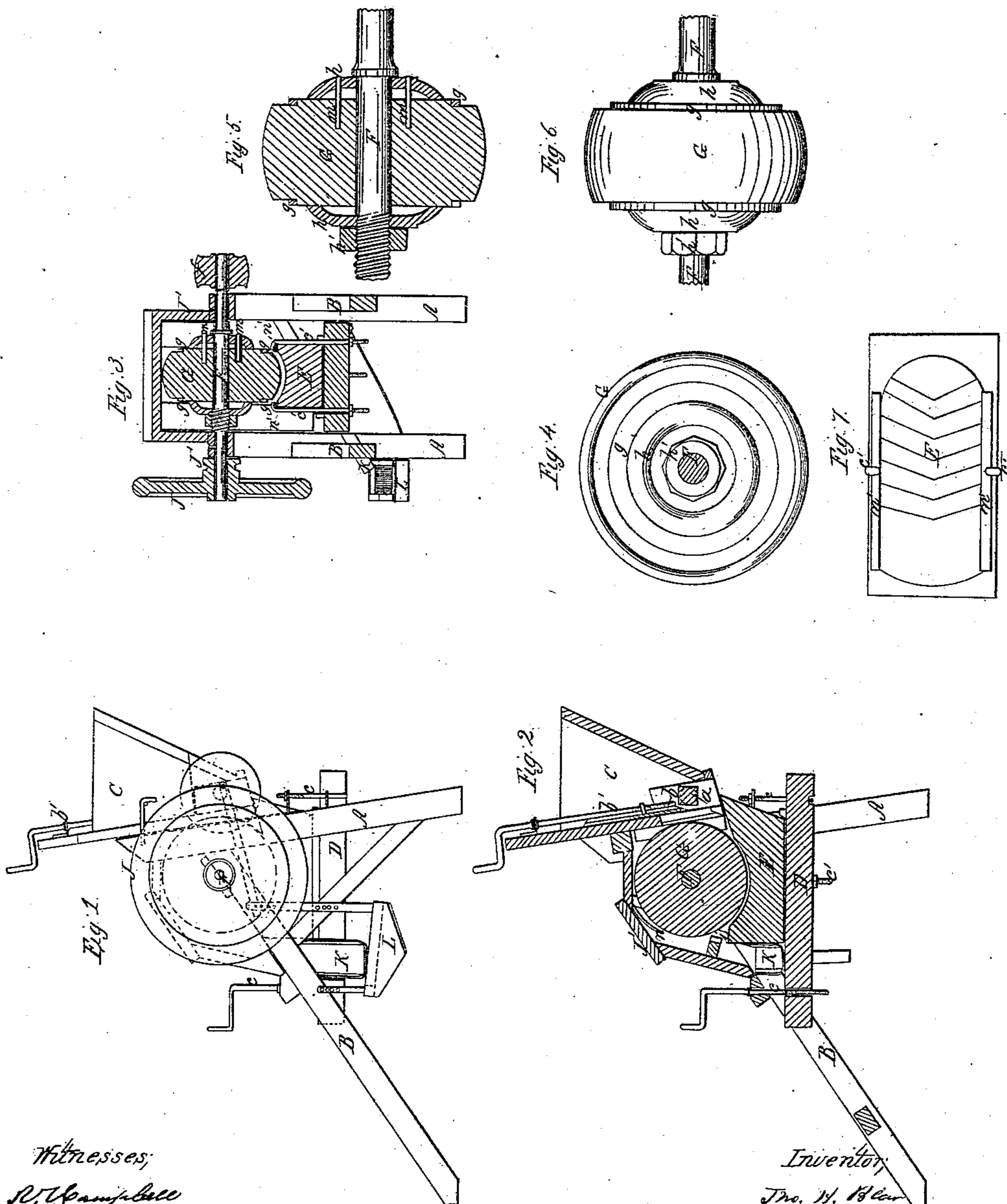


J. H. BEAR.
GRINDING MILL.

No. 61,599.

Patented Jan. 29, 1867.



Witnesses:
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JOHN H. BEAR, OF YORK, PENNSYLVANIA.

Letters Patent No. 61,599, dated January 29, 1867.

IMPROVEMENT IN GRINDING-MILLS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN H. BEAR, of York, in the county of York, and State of Pennsylvania, have invented a new and improved Grinding-Mill; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is an elevation of one side of the improved mill.

Figure 2 is a longitudinal section taken vertically through the centre of the mill.

Figure 3 is a transverse section taken vertically through the centre of the two stones.

Figures 4, 5, 6, and 7 show the construction and forms of the runner and stationary stones.

Similar letters of reference indicate corresponding parts in the several figures.

The nature of my invention consists, first, in giving the runner and bed-stones a form which is a segment of a sphere in any direction in which they are intersected. By giving this form, the substances being ground will be caused to keep at the centre of the concave, and will also be subjected to a greater amount of grinding surface in a given time between any two given points, than is the case with a stone formed with a right-line surface, or a surface formed of two truncated cones, for the reason that the amount of surface presented by a segment of a sphere is much greater than the surface presented by a right line or two intersecting right lines, all other things being equal.

My invention consists, second, in constructing the runner stone with metallic caps at its axis, which caps are held in place by stay-pins, and with metallic hoops placed around shoulders formed on its ends outside of said collars. The collars and pins serve to connect it to a revolving shaft, and the hoops permit of its being revolved rapidly around with said shaft without any liability of separation of its parts by centrifugal action.

My invention consists, third, in a novel arrangement of the platform, bed-stone, and clamp, and adjusting screws in combination with the vertically revolving runner.

My invention consists, fourth, in a novel arrangement of a deflector.

My invention consists in a novel arrangement of the hopper with the bed-stone.

My invention finally consists in a combination of metal guards, and clamp-screws, with the runner-stone and bed-stone.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

The frame of the mill may be constructed of two upright timbers A A suitably framed together, and sustained by two inclined legs B B, which will afford a wide substantial base for the mill. C represents the hopper, which is secured by accommodating hooks *w*, or other fastenings, to the upper part of the frame A, and which is provided with a rotating feeder, *a*, for preventing the grain from clogging at its discharge opening. This opening through the hopper allows the grain to flow between the stones to be ground, and a sliding gate or valve *b* is applied to this opening, and moved by means of a screw-rod, *b'*, having a crank-handle upon it, so that the flow of the grain from the hopper can be regulated by increasing or diminishing the size of the discharge opening, as shown in fig. 2. Beneath the hopper C is a horizontal platform or bed, D, which is supported by the frame A and B, by means of suspenders *c c*, which are designed for elevating or depressing the platform and levelling it. Upon the platform D the stationary stone E is mounted and secured down firmly in place thereon by means of clamping bolts *c' c'*, the upper hooked ends of which draw down upon metal straps *n' n'* that are upon the upper edges of the stone E. These straps serve as a bearing for the clamping screws *c' c'*, and they also serve as guards to prevent the escape of the grain or meal at the sides of the mill from between the runner-stone and the concave, they being arranged so as to overhang the concave to a slight degree, and also so as to just clear the ends of the runner-stone. Their office is to make a close joint between the concave and the runner-stone at the sides of the mill, about as represented in fig. 2 by dotted lines, and in figs. 3 and 7 in full black lines. This stationary stone is concave transversely, and also longitudinally, as shown in figs. 2, 3, and 7, and its front end and rear end rise considerably above the centre, as shown in fig. 2. The runner G is arranged to rotate in a vertical plane above the stone E, and it is suitably secured to a horizontal shaft F, which has its bearings upon the frame legs B B, and which is rotated by means of a belt passing over the drum *f*. On the opposite end of the shaft F to the drum *f* a fly-wheel J is secured, also a grooved pulley J', which latter rotates

the feeder *a* by means of a belt. The runner *G* is circular, and its periphery is convex transversely and adapted to fit snugly into the concavity of the stationary stone *E*, so that the convex and concave surfaces can be made perfectly true by grinding them together, after which they are set apart so as to leave the required grinding space between them. By reference to fig. 7 it will be seen that the stone *E* is picked in lines converging from its centre to its sides, which form channels that have a tendency to draw the grain and flour toward the centre of this stone to be acted upon by that portion of the surface of the runner which has the greatest speed. If desirable, the grinding surface of the runner may also be picked or grooved. The runner *G* is constructed with annular elevations projecting centrally from its sides for receiving tires or bands of metal *g g*, that are heated and shrunk on said elevations for the purpose of preserving the stone from breaking and flying off while being driven at a very high rate of speed. This runner may be secured firmly on its shaft *F* by means of circular clamps *h h*, and a nut, *h'*, which latter screws upon its shaft *F*, and is set up against one of the clamps. The flour escapes from its point of discharge *i* into a hood or cover *J*, and falls upon an inclined trough *K* which conducts it out of the mill and discharges it upon a screen in a vibrating shoe *L*, shown in figs. 1 and 3. As some of the flour which adheres to the grinding face of the running-stone *G* will be thrown off by centrifugal force, I arrange a guard *n* over this stone for directing such flour downward into the trough *K*. I am aware that it is not new to grind at the circumference of a right cylinder working in conjunction with a concave whose surface is flat, taken transversely, and therefore I do not claim broadly grinding at the circumference of a circular rotating "runner." By reference to figs. 3 and 5 it will be seen that one of the circular clamps *h* is secured to the runner by means of pins *m m* inserted through the clamp, and entering the stone some distance. These pins strengthen the stone and prevent it from breaking. It will also be seen by reference to figs. 1 and 2 that the hopper *C* rests upon the top of the stone *E*, and is attached to the frame *A* so as to rise and fall with the platform *D*, stone *E*, and the hopper *K*. And thus whenever the concave *E* is adjusted nearer to or farther from the runner-stone, the hopper will adjust itself in proper position for feeding the grain to the stones. If the hopper was supported entirely upon the frame by suspending-connections, it would be necessary to adjust it after the stone *E* had been adjusted, and thus time would be lost, and besides this the adjustment would not be as accurate and perfect as when the hopper adjusts itself simultaneously with the bed-stone or concave.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The runner-stone *G*, constructed with a surface for grinding, which is a segment of a sphere in any direction in which it may be intersected, in combination with the concave *E*, which also is of a shape to conform to said runner-stone; the said runner-stone and concave being arranged and operated substantially in the manner and for the purpose described.
2. The arrangement of the platform *D*, concave stone *E*, clamp-screws *c' c'*, and adjusting screws *c c*, in combination with the vertically revolving runner-stone *G*, substantially in the manner and for the purpose described.
3. The deflector *n*, applied substantially in the manner and for the purpose described.
4. Arranging the hopper so that its lower end rests upon the stone *E*, and connecting its upper end to the frame *A*, by hooks or fastenings which will allow it to descend or rise with the stone *E*, substantially in the manner and for the purpose described.
5. The combination of the metal guards *n'*, and clamp-screws *c' c'*, with the runner-stone and concave, substantially in the manner and for the purpose described.

JOHN H. BEAR.

Witnesses:

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