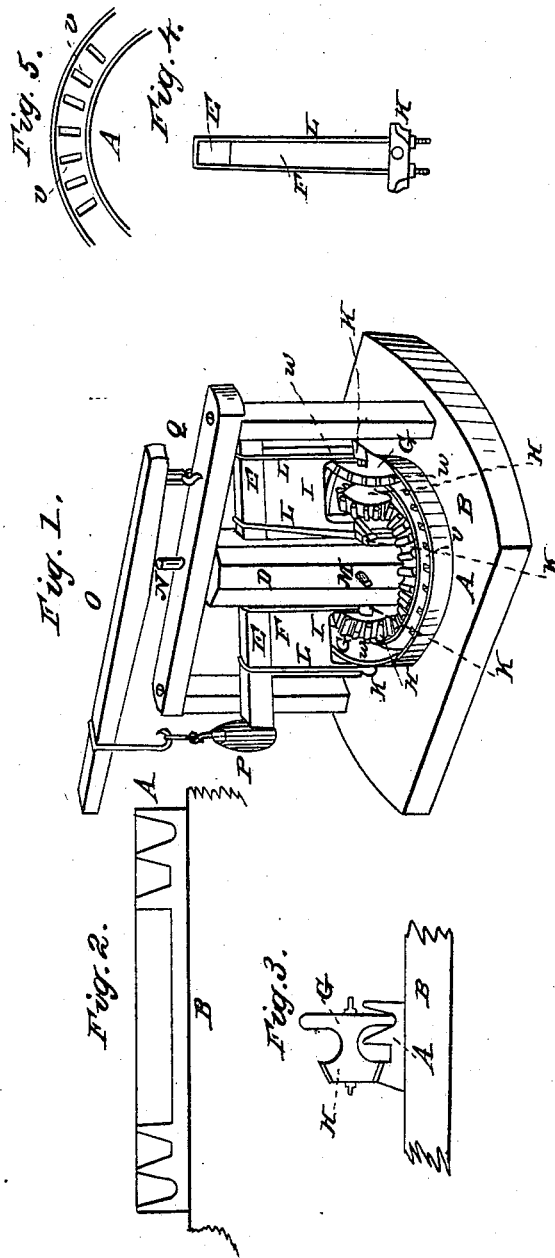


J. ROWE.
Grinding Mill.

No. 1,560.

Patented April 24, 1840.



UNITED STATES PATENT OFFICE.

JAMES ROWE, OF ATHENS, ALABAMA.

IMPROVEMENT IN MACHINES FOR CRUSHING HARD SUBSTANCES.

Specification forming part of Letters Patent No. 1,560, dated April 24, 1840.

To all whom it may concern:

Be it known that I, JAMES ROWE, of Athens, in the county of Limestone and State of Alabama, have invented a new and Improved Mill for Grinding Hard Substances by Pressure; and I do hereby declare that the following is a full and exact description thereof, reference being had to the annexed drawings of the same, making part of this specification.

Figure 1 is a perspective view. Fig. 2 is a section of the valley or circular trough. Fig. 3 is a vertical section through one of the wheels and part of the circular trough in which it turns; Fig. 4, section of one of the plummer-blocks and end of beam.

My invention consists in a peculiar formation of a circular trough A, Figs. 1 and 2, to any given radius. This trough is made in its cross-section the figure of an inverted cone, frustum of a cone, or semi-oval, and the sides are made higher or lower and inclined or splayed, according to the objects of application, and of any suitable material, such as wood, metal, &c.

The circular trough is laid on a suitable foundation B and firmly united thereto by bolts under the center of a house or shed suitable for it. Second, a horizontal bevel cog-wheel C is fastened on the same foundation inside the trough and reduced to about half its diameter. In the center of said cog-wheel (which is also the center of the valley) there is secured an oil cup or box to receive the lower gudgeon of an upright shaft D. Third, a large strong shaft D is erected in a perpendicular position with a strong gudgeon in each end from four to nine inches in length. The upper gudgeon turns in a box above and the lower gudgeon in the oil-cup, as just mentioned, which should be made of sufficient depth to allow the shaft room to play up and down from one to three inches. Through the shaft is a large mortise, commencing near the bottom and extending up three or four feet, into which two pieces of timber E and F are inserted, united to each other by dowel-pins and stirrups L. Fourth, the upper piece E extends beyond the ends of the lower piece F far enough to form sweeps for the horses or oxen to draw by. The pieces thus united are made to answer the end of a vibrating beam having a

wheel G, turning near each end of the lower piece F in spaces I I, made therein. Fifth, these wheels G are made of solid iron, or if of wood they should be shod with iron. A strong axle is passed horizontally through the center of each wheel and is firmly fastened therein, the axle being of proper length, having a journal or bearing on each end turning in plummer-blocks hereinafter described, and on the ends of the axles toward the center of the machine is placed a bevel-pinion H, one on each axle.

The lower part F of the vibrating beam above described is cut away at I, so as to admit half the diameter of each wheel and pinion, and on the lower parts of said timbers F (not cut away) are placed four boxes or plummer-blocks K K K K, with a hole through the ends of said plummer-blocks, through which the lower parts of four stirrups L L L L pass, which stirrups embrace the vibrating beam, and by means of a screw and nut on each end of said stirrups the parts of the vibrating beam and the plummer-blocks are drawn firmly together. The axles of the wheels and pinions are placed with their bearings or pivots turning in the plummer-blocks, so that the wheel will travel in the center of the valley and the pinion will work in the bevel cog-wheel.

A hole is made horizontally through the shaft D and through the lower part of the timber F of the vibrating beam, into which a strong pin M is put, which answers the end of a fulcrum on which the vibrating beam rests, and permits the wheels attached thereto to rise and fall as they meet with alternate inequalities in the circular trough, and when both wheels meet inequalities in the trough or valley at the same time the shaft rises vertically, it being made shorter than the space between the foundation and cap. In the top of the upper gudgeon, which passes through the cap, is an indentation or cavity, into which the point of a strong spindle N is inserted, the upper end of which spindle being fastened into the under side of a lever O, and one end of which lever being fastened by a strong hinge or joint Q to the upper side of the cap-piece, the other end extends beyond the side of the machine and has a weight P on its longer end to increase the pressure of the

wheels. By this lever and weight any given pressure may be thrown on the wheels by shifting the position of the weight, which also may be increased or diminished. The grinding-wheels are about three feet in diameter, and the face of the wheels are made conical or rounded, so that when they are placed in the bottom of the trough or valley the centers only touch, and as they move round they press through the substances to be ground and force it up each side of the circular trough, which is splayed or inclined, and as the wheels advance the coarser particles again fall into the cut made by the wheels and are again and again operated upon by the wheels in their revolutions around in the circular trough till the whole mass is mashed and ground as fine as desired. The wheels on their treads may be made smooth, as before stated, or they may be made uneven by notches, cuts, or ratchets, according to the purpose of application.

The pinions traveling in the cog-wheel are geared as deep as possible and are designed to prevent the grinding or crushing wheels from slipping round when they come in contact with very hard substances.

The gearing-wheels in some cases may be wholly dispensed with, particularly in grinding soft substances and also in grinding hard substances by means of slight and regular or irregular indentations *v* or projections in the bottom of the circular trough for the projections *w* on the face of the grinding-wheels to take against, by means of which the wheels may be prevented from slipping. When the grinding-wheels meet such substances as cannot be broken by them and consequently pass over them, care should be taken to prevent the rise of the wheels in both instances from being so great as to separate the gearing. This may be prevented by a stop inserted into the cap for the shaft to strike against.

The manner in which weight is applied for increasing the pressure of the wheels may be varied from the lever principle already described, first, by putting the weight on the sweep by which the horses pull, and, second, by means of arms inserted through the shaft above said sweep, on which a strong floor may be laid and weight put thereon.

I contemplate the application of my machine as follows: first, for grinding corn into meal, wheat into flour for table use, cobs,

shucks, and corn for feeding stock, for grinding straw, fruit, &c.; second, for grinding limestone, shells, bones, plaster, and all other suitable substances into powder for manuring soil; third, for breaking rock into small pieces for making roads, streets, &c., and, fourth, for any purpose to which it may be applied.

The drawings represent a mill or machine which will have to be fed by hand, and the ground substance must be removed by a shovel adapted to the trough or other article. The horses, to move the wheels, are to be attached to the sweeps by any suitable contrivances known to mechanics and others.

The advantages to be derived from this machine are, first, it stirs up its own contents to be ground; second, the cog-wheel and pinions or the projections or indentations on the bottom of the valley either are an effectual remedy against the slipping of the grinding-wheels on hard substances, they being compelled to turn; third, two or more wheels being united to a common center are enabled to accommodate themselves to all the inequalities of the substances to be ground in the circular trough, and carry as weight the center shaft and all its appendages; fourth, the power being applied to sweeps connected to the vibrating beam carrying the wheels the draft causes but little strain to the center or vertical shaft, and, fifth, instead of using heavy wheels for grinding any given weight may be added to them by means of the lever or platform, which weight may be regulated at pleasure.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. The mode herein described of preventing the grinding-wheels from slipping by means of the cog-gearing or by cross projections and indentations in the bottom of the valley, together with cuts, cogs, or notches on the tread of the grinding-wheels.

2. The method of applying the weight of the center revolving shaft or any additional weight which may be applied thereto to the grinding or crushing wheels by making the shaft bear upon the vibrating beam to which the wheels are attached, as herein described.

JAMES ROWE.

Witnesses:

WM. CAIN,
P. B. ROBINSON.