

J. D. WHELPLEY & J. J. STORER.  
GRINDING MILL.

No. 44,990.

Patented Nov. 8, 1864.

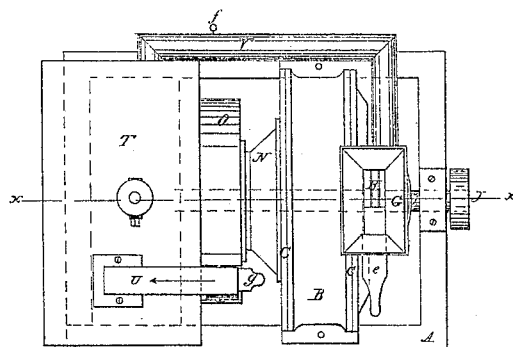


Fig. 1.

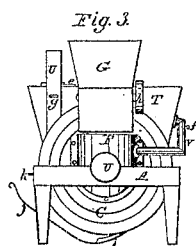


Fig. 3.

Fig. 4.

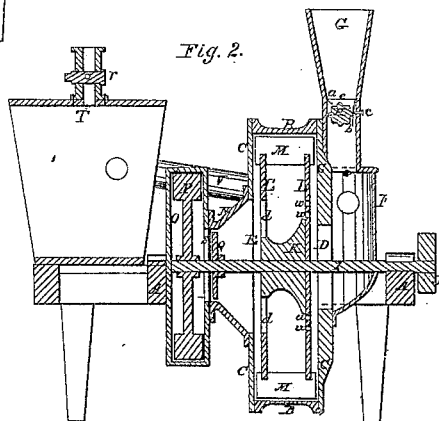


Fig. 2.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN GRINDING-MILLS

Specification forming part of Letters Patent No. 44,990, dated November 8, 1864.

*To all whom it may concern :*

Be it known that we, J. D. WHELPLEY and J. J. STORER, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Grinding-Mills; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a top view; Fig. 2, a vertical section in the line *x* of Fig. 1; Fig. 3, a diminished end elevation, &c.; Fig. 4, a section (enlarged) through one of the beaters.

Like parts are indicated by the same letters in all the drawings.

Our present invention is intended to be an improvement on the patent granted to us on the 30th day of September, 1862, under which we have been operating the past three years; and it consists, first, in the employment of a return-pipe, furnished with a valve or regulator, leading from the collecting-chamber into the hopper, for the purpose of relieving the pressure of air in the chamber when said pipe is used in combination with a grinding-mill provided with a central opening or delivery; second, in a graduating feeder, whereby more or less material may be fed into the mill, and coarser or finer; third, in the employment at the bottom of the mill of a trap-door, *i*, for the purpose of letting down heavy particles or lumps of metal collected in the mill when the latter is in motion, while the dust and lighter particles are carried away by the blast of air through the central delivery; fourth, in the employment of rotating arms *Q*, either with or without brushes attached in front of the sieve *S*, for the purpose of keeping it from clogging; fifth, in the employment of an adjustable valve, *f*, in the return-pipe for the purpose of regulating the return of the air, and consequently the quantity and quality of the yield; sixth, in introducing steam into the collecting-chamber or fan-blower, or any part of the mill, for the purpose of condensing and settling the fine dust; seventh, in constructing the beaters with broad faces (from three to ten inches broad) to move as closely as possible to the sides of the mill, and at a distance of one inch (more or less) from its periphery, for the purpose of confining the air

in the mill (except as drawn out at the central hole) and giving it a rapid rotary motion, so that the coarse particles shall be kept out near the periphery of the mill by the rapid rotary motion of the air and the beaters, while the finer particles and dust shall be drawn out from the central opening or delivery; eighth, in the employment of an adjustable valve to regulate the exit of air from the fan-blower; and, ninth, in furnishing the plate or disk *L*, which distributes the air, with perforations *w* near its center, to serve as a sieve, through which the dust from the return-pipe may be passed into the center of the mill and returned to the chamber without clogging the action of the hammers.

To enable others skilled in the art to make and use our invention, we will now describe its construction and operation.

*A* is the foundation or form on which the mill is placed.

*B* is the periphery of the grinding-cylinder; and *C C* are its sides, constructed, of iron, substantially as described in the patent alluded to above.

*D* is a central hole in one side of the cylinder, through which the materials to be ground are fed from the hopper *F* into the mill, and *E* is a similar central hole in the other side of the mill, through which the finely-powdered materials are drawn out into the conductor *N* by the fan-blower *P*.

*I* is a horizontal shaft turning in suitable bearings in the form *A*, and *J* is its driving-pulley.

*K* is the hub of the beater-wheel fast to the axle *I*.

*L* is a disk, fast to one end of the hub *K*, and provided with perforations *w* near its center, as shown in Fig. 2, for the purpose described above, said perforations being from one-half inch to two inches in diameter, and having a combined area equal that of the return-pipe.

*L'* is a disk, of the same diameter as *L*, attached to the opposite end of the hub *K*, but provided with large holes *d* round the center for the delivery of air and dust.

*M* are the beaters, confined to and between the disks *L L'*, as shown in Fig. 2. These beaters we construct from three to ten inches deep, after the manner of a fan-blower, for the purposes specified above.

*o o* are screw bolts passed through the wrought-iron plate, as shown in Fig. 4, before the cast-iron is chilled upon it, by means of which bolts and suitable nuts the beaters are secured to start from the disks *L* and *L'*.

*S* is a sieve of wire-gauze or perforated metal, situated between the conductor *N* and the shell *O* of the blower, as represented in Fig. 2, the object of said sieve being to prevent particles too large from being accidentally thrown out of the mill.

*Q* are rotating arms, (either with or without brushes attached thereto,) fast to the axle *I*, as shown in Fig. 2, and moving very near to the sieve *S*, to keep the latter from clogging with dust.

*U*, Fig. 1, is a pipe leading from the periphery of the fan-blower into the collecting-chamber *T*, the sides of which are covered with cloth, as and for the purpose described in our former patent alluded to above.

*g* is an adjustable valve in the pipe *U*, for the purpose of regulating the exit of air from the fan-blower.

*r* is a pipe for the introduction of steam into the chamber *T* for the purpose of condensing and settling the dust. This pipe *r*, however, may be so inserted as to admit the steam into any other part of the mill, so as to mingle with the dust and produce the required result.

*V* is the return-pipe, leading from the chamber *T* to the lower part of the hopper *F*, and *f i* an adjustable valve in said pipe, the design of both of which has been described above.

*G* is the box or hopper into which the material to be ground is thrown.

*H* is the feeding-cylinder, situated, as seen in Fig. 2, at the bottom of the hopper *G*, turning in suitable bearings in its sides, and driven by the pulley *h*. (See Fig. 3.) This cylinder *H* is provided with longitudinal grooves or teeth, as shown in Fig. 2.

*a* is a piece of sheet metal attached to the one side of the hopper *G*, so that its lower edge shall all but touch the periphery of the cylinder *H*, as represented in Fig. 2.

*b* is a flat spring of sheet metal, or its equivalent, attached one side of the hopper *G* and extending down below the center of

the cylinder *H*, and nearly touching the same, as shown in Fig. 2.

*c* is a set-screw, by means of which the spring-plate *b* may be adjusted nearer to the cylinder *H* or farther from it, as may be desired. As the cylinder *H* revolves toward the spring-plate *b*, the latter will yield a little whenever a particle too large is brought against it by the cylinder *H*, and thus allow it to pass down instead of clogging.

*e* is an adjustable sliding cover, by means of which the quantity of material fed into the mill may be regulated.

*i* (see Fig. 3) is a trap door hinged at one end to the bottom of the periphery *B* of the mill, the free end being provided with a lever, *j*, by means of which the said trap-door may be readily opened or closed by the attendant while the mill is in motion, and for the purpose specified above.

*k* is a catch, onto which the lever *j* is hooked, for the purpose of supporting the trap-door and keeping it closed.

We do not claim, broadly, the employment of a return-pipe for the purpose of causing a circulation of air or water through and through a mill or machine independently of our particular combination, as such pipes have been long in general use; but

What we do claim as new, and desire to secure by Letters Patent, is—

1. The employment of an adjustable valve, *f*, in a return-pipe, *V*, for regulating the quality and quantity of the yield; substantially as described.

2. The employment of the trap-door *i*, the grooved cylinder *H*, the spring-plate *b*, the slide or cover *e*, and the beaters *M*, in combination with the grinding-mill, all constructed and arranged substantially as set forth.

3. Introducing steam into the collecting-chamber, fan-blower, or any part of the mill, for the purpose described.

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