(No Model.) 2 Sheets—Sheet 1.

R. KENT.

GRINDING MILL.

No. 406,651. Patented July 9, 1889.

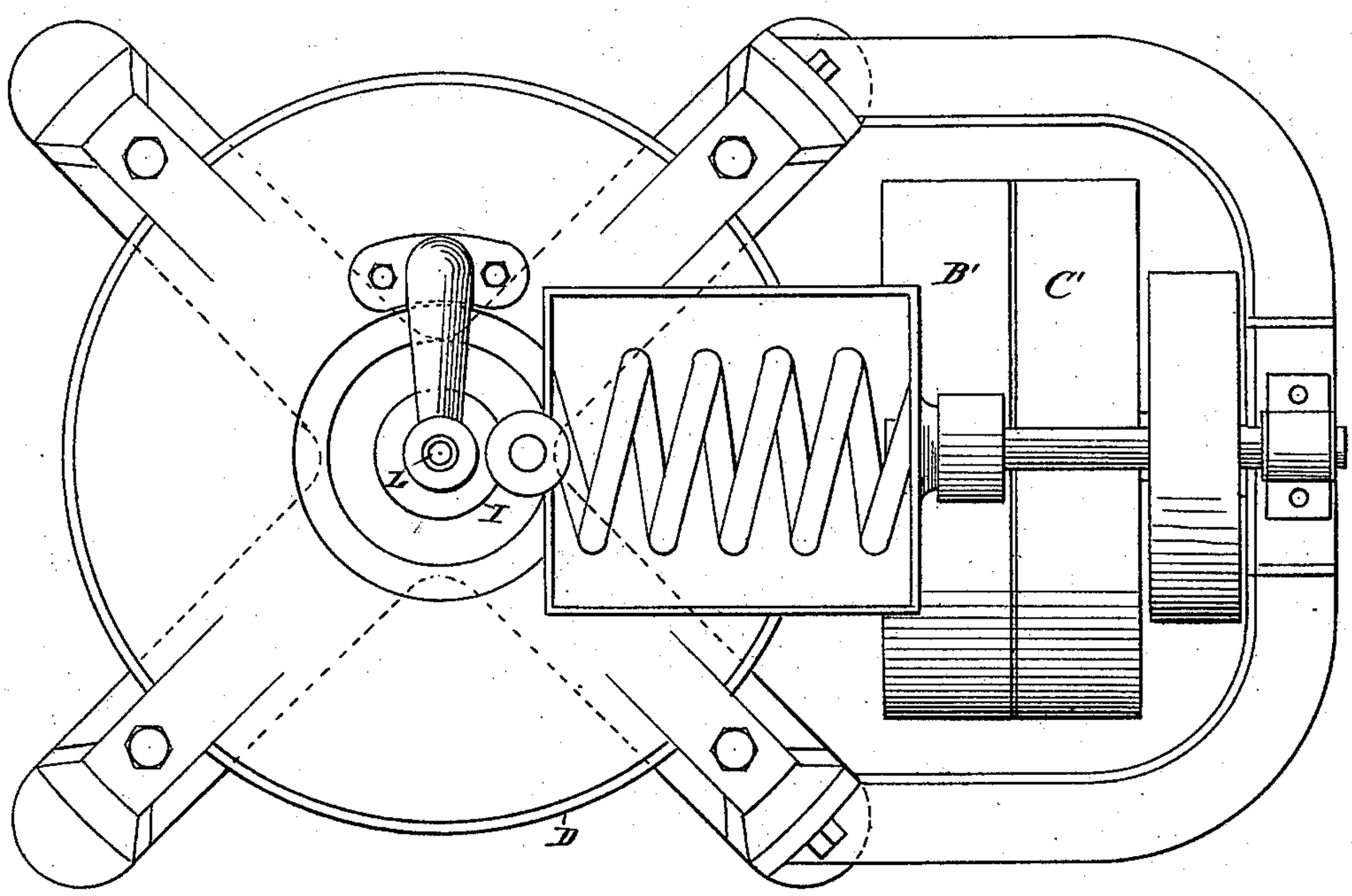

Fig. 1.

WITNESSES:

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Charles A. Herbert.

INVENTOR

Robert Kent

BY

James A. Whitney

ATTORNEY

(No Model.) 2 Sheets—Sheet 2.

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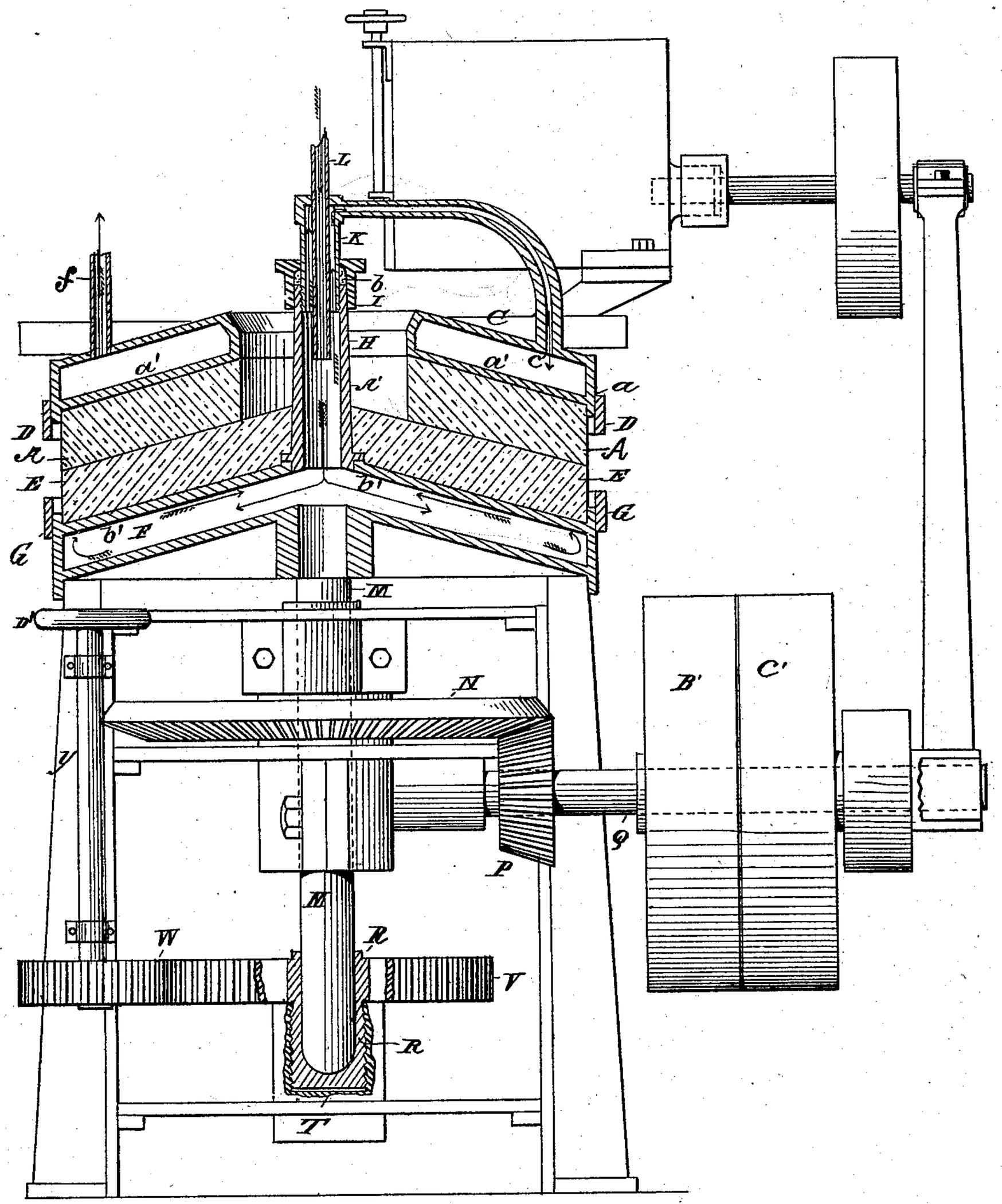

Fig. 2.

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UNITED STATES PATENT OFFICE.

ROBERT KENT, OF BROOKLYN, NEW YORK.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 406,651, dated July 9, 1889.

Application filed April 29, 1887. Serial No. 236,537. (No model.)

To all whom it may concern:

Be it known that I, ROBERT KENT, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Grinding-Mills; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention consists of certain improvements in grinding-mills, which are pointed out in the claim concluding this specification.

Figure 1 is a plan view, and Fig. 2 a vertical transverse sectional view illustrating my said invention.

A is the fixed upper stone, having the usual central opening A′. This stone A, made of burr or other stone in the usual manner, is attached to the hollow annular casting C, the outer circumference *a* of said casting being preferably provided with a surrounding band or flange D. The stone A, casting C, and band D are stationary and supported by the usual or by any suitable means. The lower stone E is secured upon a hollow casting F, which latter is preferably arranged to run within a fixed circumferential band G. From the center of the casting F, and extending upward through the center of the stone E, is a tubular sleeve H, the upper part of which is arranged within a stuffing-box I, of which the packing is shown at *b*. This sleeve H communicates with a pipe K, which is so shaped and arranged as to connect at its opposite end with the interior of the hollow casting C. The casting C has an inner wall *a′*, which separates its interior or internal chamber from the contiguous surface of the stone, in order that the cooling agent may not come in direct contact with the latter. In like manner and for like purpose the casting F has a like inner surface *b′*, upon which the lower stone rests. At another part provided at the opposite side of the casting C is an outlet-pipe *f*. A pipe L, of similar diameter, is passed from the outside through that part of the pipe K which connects with the stuffing-box and with the interior of the sleeve H, as just explained. This pipe L is connected at its outer end with a water-tank or any other suitable source of supply of cold water or of cold air or any other refrigerating-fluid. The lower hollow casting F is supported upon the upper end of a shaft M, which carries a beveled wheel N, which in its turn gears into a beveled pinion P on a suitable horizontal driving-shaft Q, which may be provided with fast and loose pulleys B′ and C′. The lower end of the shaft M is stepped into a hollow socket R, which is externally threaded and screwed into a fixed nut T, which, like the upper bearing of the shaft M and the bearings of the driving-shaft Q, is stationary and preferably fastened upon the fixed frame-work of the apparatus. Upon the upper part of the threaded socket R is a spur-wheel V, into which gears a spur-pinion W upon the lower end of a vertical shaft Y, which is supported in suitable fixed bearings, and which has at its upper end a hand-wheel D′, or equivalent device—such, for example, as a crank—from which the spur-pinion W may be readily turned. By turning the shaft Y, and consequently the spur-pinion W, spur-wheel V, and threaded socket R, the latter may be raised and lowered—in other words, delicately adjusted—to raise and lower the shaft M, and consequently the lower stone, to adjust the latter in exactly the desired relation to the upper stone, not only to adapt the mill to the requirements of any particular material, but also for the wearing away of the stone by continued use.

Cold water or other refrigerating-fluid being caused to pass inward through the pipe L passes into the interior or "water-space," so called, of the lower casting F, this inward cooling being through the middle portion of the sleeve H and along the lower part of the casting F. On reaching the circumference of the latter it returns and flows along the top of said casting, thence upward through the circumferential portions of the sleeve H into and through the pipe K, thence into the interior or "water-space," so called, of the upper casting, and thence out through the outlet-pipe *f*, so that by this means the upper and the lower stones are kept cool by the circulation of what is substantially one and the same stream of water or cooling-fluid.

When the apparatus is to be used in grinding paints and the like, in which the stones

are to be kept cool, cold water or other refrigerating-fluid is to be used, as hereinbefore set forth; but in the grinding of materials which require to be heated during the operation the water should be heated by any suitable means to the requisite extent; or steam or hot air or other suitable heated fluid may be used for circulating through the apparatus, as described, for bringing the stones to the requisite temperature.

Referring to Fig. 1, it will be seen that the relation of the sleeve H of the lower hollow casting to the supply-pipe L and to the upper hollow casting and its supply-pipe gives the important advantage of causing the water flowing out from the lower casting to flow past the entering stream and around the supply-pipe L to the hollow casting of the upper stone. This outflow of the water in its cooling function upon the lower stone, and from which it has absorbed heat, is again cooled before it enters the casting of the upper stone by having to pass and mingle with the body of the inflow and to pass out above the stones around the supply-pipe to perform its cooling function within the upper casting. In this provision for cooling the water, in passing from one stone to the other, the inflow and the outflow are in opposite directions and their conjunction is within the same pipe. This advantage cannot be obtained in a construction wherein the water has a direct flow from the cooling-chamber of the upper stone to the cooling-chamber of the lower stone, the inflow and the outflow being in the same direction.

What I claim as my invention is—

In a grinding-mill, the combination of the upper and the lower stones and their hollow metal chambers with means for producing a circulation of water within said chambers, consisting of the sleeve H, extending from the lower chamber up through the eye of and above the upper stone and its cooling-chamber, the pipe K, having a stuffing-box I, connecting it with the upper end of said sleeve, and having also a lateral branch communicating with the cooling-chamber of the upper stone, and the supply-pipe L, passing into the top of said pipe K and terminating below the communication of the latter with its side branch, whereby the cold water entering the supply-pipe and the lower cooling-chamber is caused to return and pass from the latter by the inflow and around the supply-pipe to the upper cooling-chamber, substantially as described.

ROBERT KENT.

Witnesses:
JAMES W. KENT,
JAMES ROBERTSON.