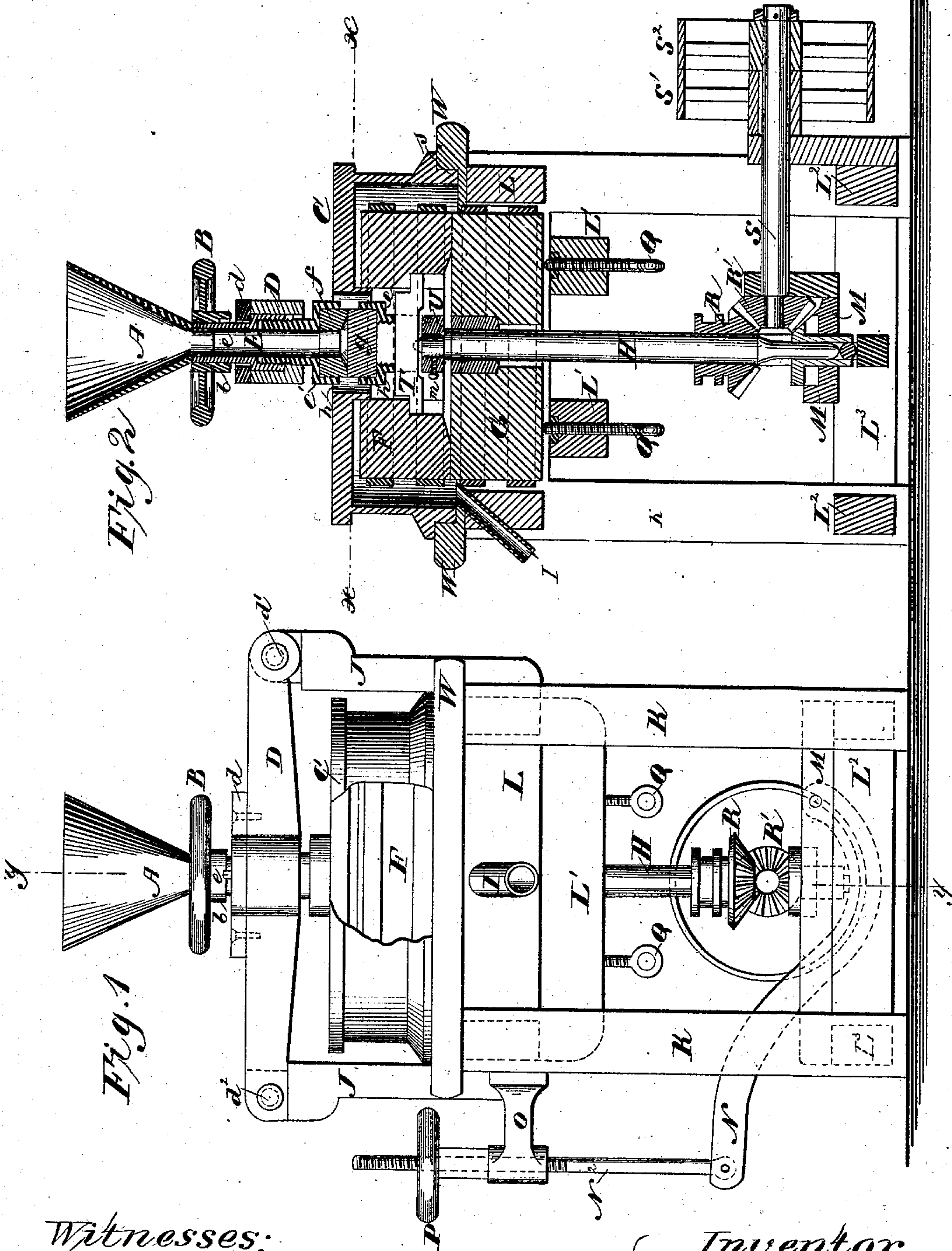


L. DURAND.
Grinding-Mill.

No. 224,664.

Patented Feb. 17, 1880.



Witnesses:

J. A. Durand
J. M. Loyal

Inventor
L. Durand.

by R. D. Williams
Atty-

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Fig. 5.

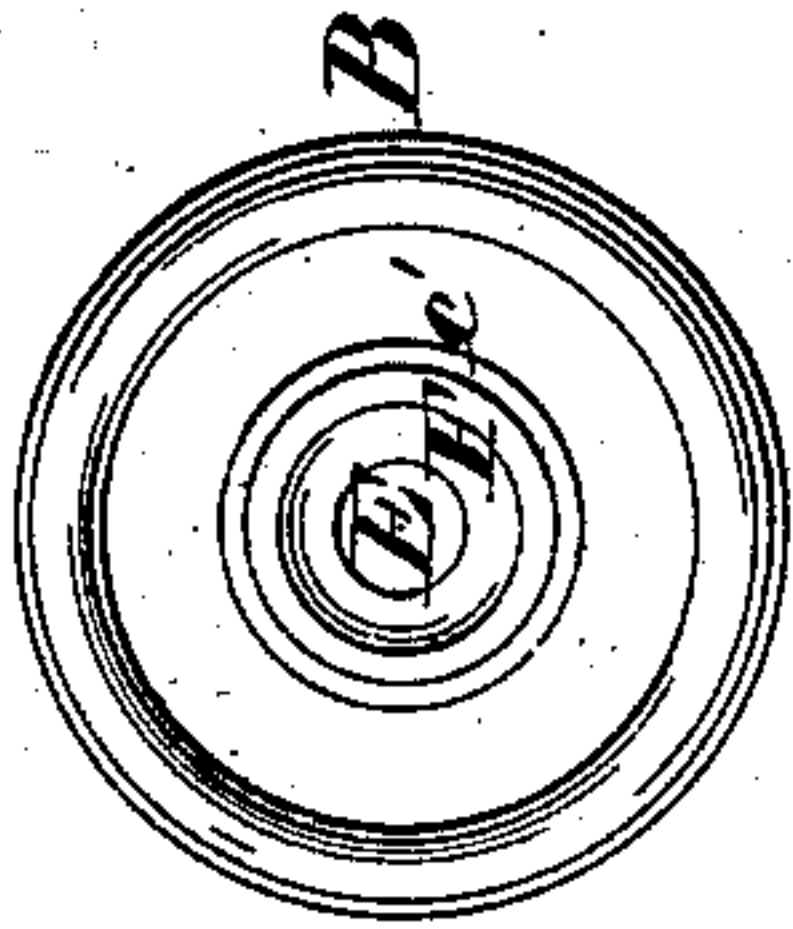


Fig. 4.

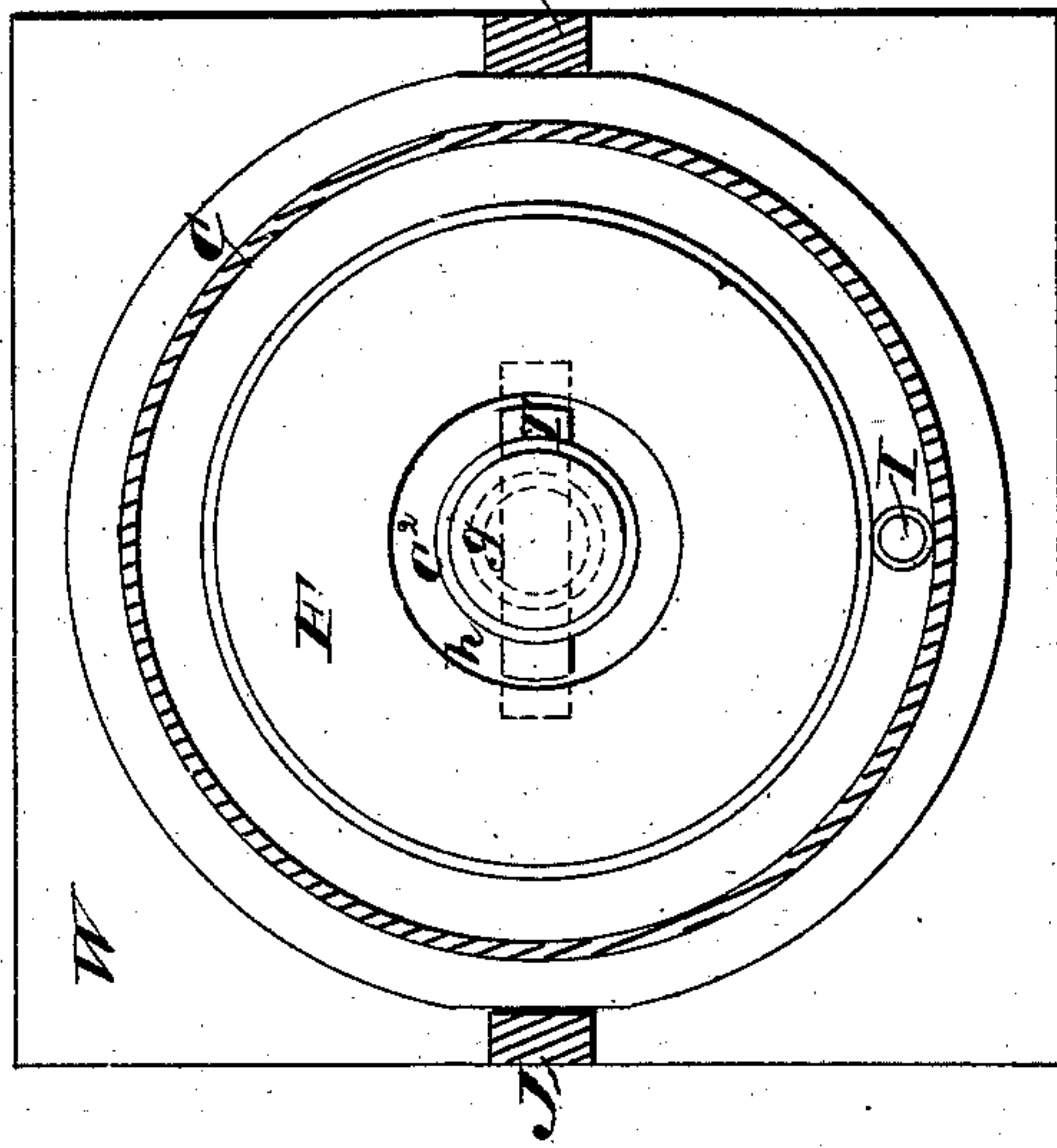
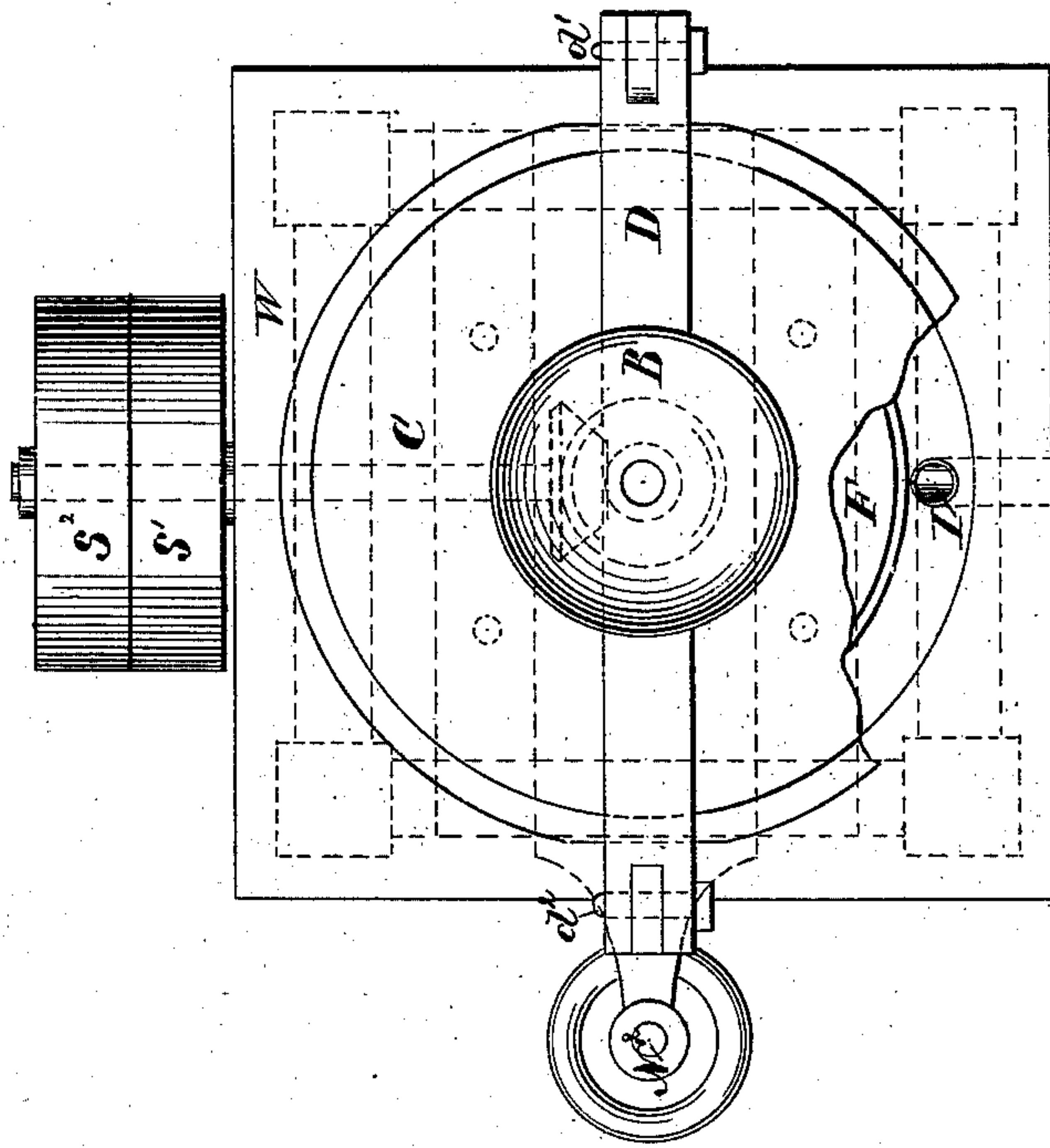


Fig. 3.



Witnesses:

Handwritten signatures of witnesses.

Inventor.
L. Durand.

by *Handwritten signature of R. D. Villanueva*
Att'y.

UNITED STATES PATENT OFFICE.

LOUIS DURAND, OF QUEBEC, PROVINCE OF QUEBEC, CANADA, ASSIGNOR OF
ONE-HALF OF HIS RIGHT TO DEXTER H. WALKER, OF NEW YORK, N. Y.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 224,664, dated February 17, 1880.

Application filed June 5, 1879.

To all whom it may concern:

Be it known that I, LOUIS DURAND, of Quebec, in the Province of Quebec and Dominion of Canada, have invented a new and Improved Mill, of which the following is a specification.

The object of my invention is to provide a mill in which the material is crushed before coming onto the principal grinding-stones, and, further, to provide an air-space through which the farina has to pass during the operation.

The invention consists of a mill having a fixed and a revolving stone, and above the latter a crushing apparatus consisting of a small revolving stone fastened to the shaft and a small fixed stone above the small revolving stone, the parts being combined and operating as hereinafter described.

In the drawings, Figure 1 is a front elevation with part of the box broken off. Fig. 2 is a vertical section on the line $y y$. Fig. 3 is a plan view with part of the cover of the box broken off. Fig. 4 is a horizontal section on the line $x x$. Fig. 5 is a view of the under side of the small fixed stone.

Similar letters of reference indicate corresponding parts.

The uprights $K K$ and the cross-pieces $L' L^2 L^3$ form the frame of the mill. W is the top plate, supporting the box C , which fits into the recess s .

$J J$ are two uprights, supporting the cross-bar D , which is pivoted at d' , and secured at the other end by a pin, d^2 . d is a small plate, fastened to the top of D to hold the tube E in position.

A is the funnel, into which the material is poured. The neck of this funnel passes into a tube, E , the lower part of which is widened and threaded. The wheel B , provided with the neck b , encircles this tube E . There is a slot or notch in b , which engages with a pin, e , on the tube E .

c' is the box into which the upper small fixed stone, f , is fastened. The upper part of this box forms a threaded tube, which engages with the threaded part of E . All these parts are supported on the cross-piece D .

H is the main shaft, and derives its motion from the shaft S by means of the bevel-cogs R

and R' , or some similar arrangement. S' and S^2 are a loose and a fast pulley on the shaft S .

A cap, U , is fastened to the upper end of the shaft H and secured by the screw m . This cap widens on top, and forms the box c^2 for the lower small revolving stone, g . A balance, T , rests on the top of the shaft, passes through the cap U , and supports the large revolving stone F , as is shown in Fig. 2.

G is the large fixed stone, and rests on the cross-pieces $L' L'$, and is graduated by means of the screw-pins $Q Q$, and has a central opening, through which the shaft H passes.

h and h' is an annular opening in the box C , and is between the box c^2 of the smaller rotating stone g and the stone F .

I is a tube, through which the flour flows off. N is the bent lever, which supports the lower end of the shaft H . It is raised or lowered by means of the screw P and rod N^2 .

The small fixed stone f and the large revolving stone F have a central opening, through which the material which is to be ground passes down.

The operation is as follows: The material which is to be ground is poured into the funnel A , passes down through the tube E onto the revolving stone g . Here it is crushed between the two stones f and g and thrown outward by the centrifugal force, and falls onto the fixed stone G . It is then ground between the stones G and F , and then passes down through the tube I .

The operation can be regulated in the following manner: The notch in the sleeve b catches the pin e on the outside of the tube E , so that if the hand-wheel B is turned the tube E will turn with it. As the small plate d prevents E from moving upward, the box c' must necessarily rise or fall as the screw-threads of c' and E engage each other. In this way the contact between f and g can be regulated. The contact between F and G can be regulated by means of the lever N , as is seen from the drawings.

The advantages of my mill are the following: The grain is first crushed between the stones f and g , and then falls down into G . In doing so it has to pass through the air-space h and h' . In passing through this current of

air, which is produced in this air-space, the farina is cooled, and does not fall on the stone G in a warm condition. The fault with all other mills was, that the grain and the stones very soon became hot, and the quality of the farina deteriorated.

Another great advantage is, that the grain is crushed between the small stones *f* and *g*, and as this operation is performed on a very small surface it can be done with less power than in any other system of mills.

My system of arranging mills—*i. e.*, arranging a small additional crushing apparatus on the upper end of the shaft—can be applied to any kind of mill, large or small, and any kind of power can be used to drive the mill.

As the cross-piece D is pivoted at *d'*, it can be very easily raised. The upper part of the small crushing apparatus is raised with it, and

the stones can be very conveniently examined or resharpened.

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

The spindle H, provided with the slotted cap or head U, enlarged to form at the top the receiving-cap for the horizontal cracker-runner *g*, in combination with the driving-bail T and flouring-runner F, whereby both sets of horizontal reducing-burrs are operated from the same driving-spindle, as set forth.

LOUIS DURAND.

Witnesses:

W. DARLING CAMPBELL,
Of Quebec, Notary Public.

JNO. D. BROWN,
Of Quebec, Clerk.