

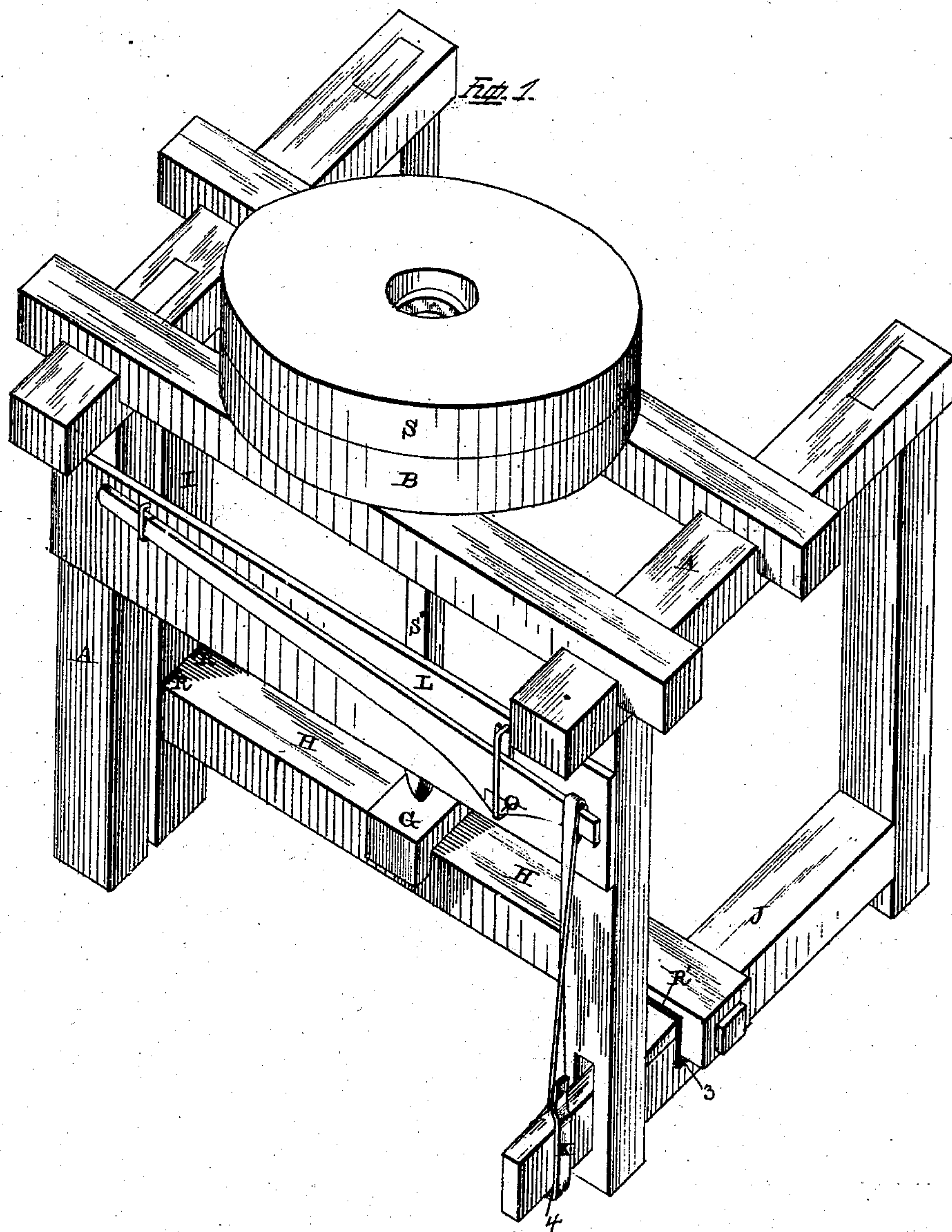
(No Model.)

3 Sheets—Sheet 1.

W. C. HALE.
Mounting Millstones.

No. 237,268.

Patented Feb. 1, 1881.



WITNESSES

Wm. W. Mortimer,

A. H. Cushing

INVENTOR

W. C. Hale,

per

F. A. Lehmann,
Att'y

(No Model.)

3 Sheets—Sheet 2.

W. C. HALE.
Mounting Millstones.

No. 237,268.

Patented Feb. 1, 1881.

Fig. 2.

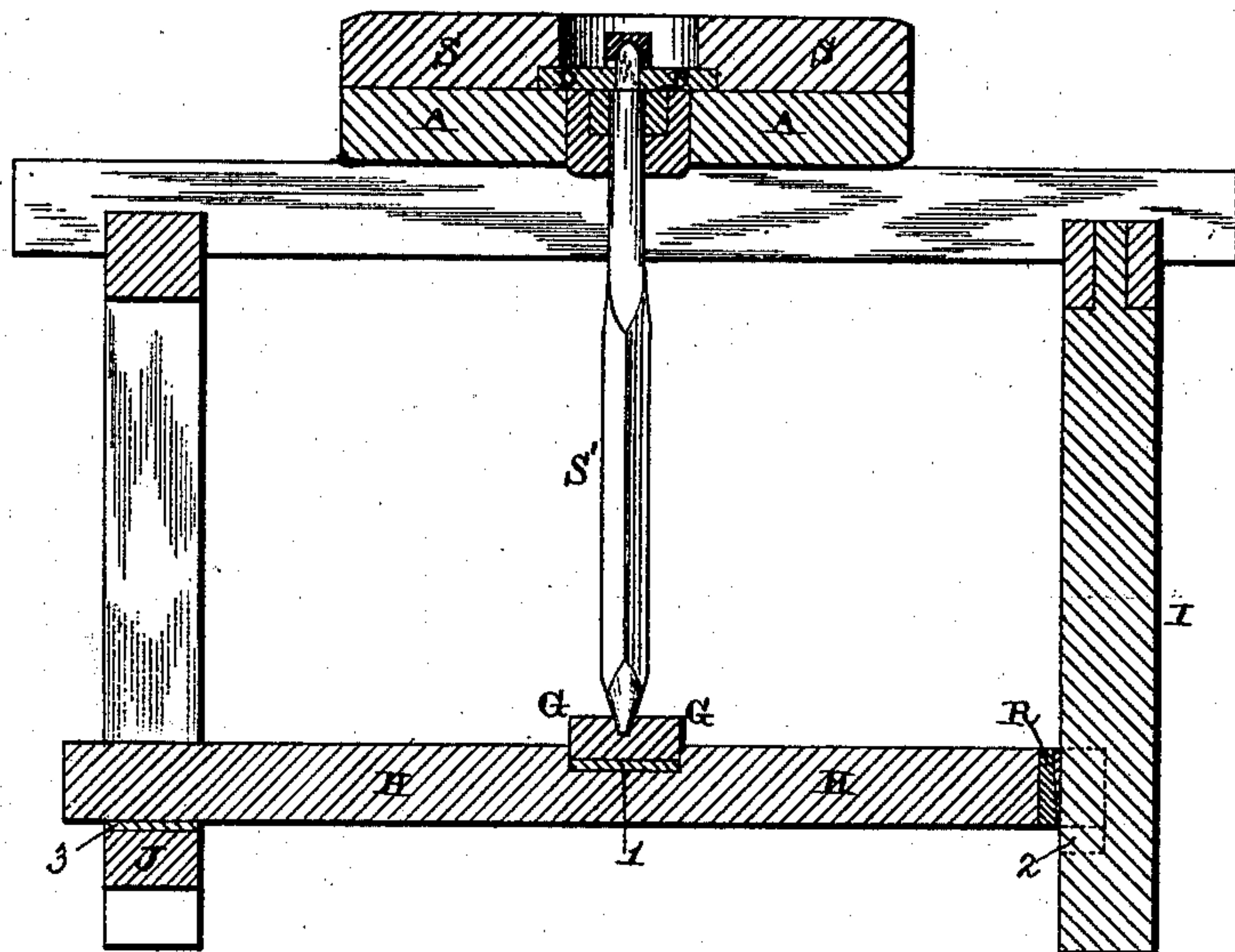


Fig. 3.

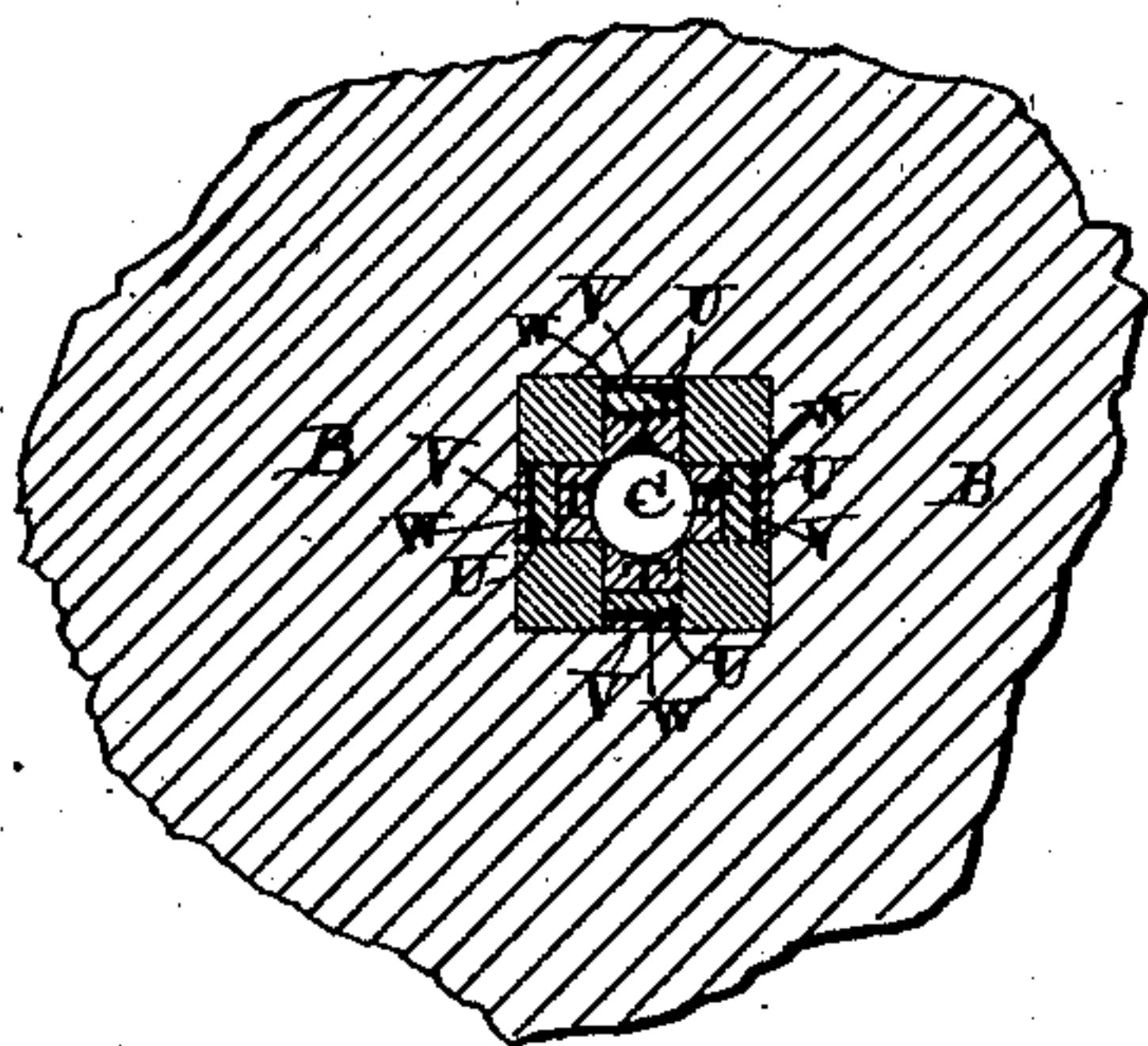
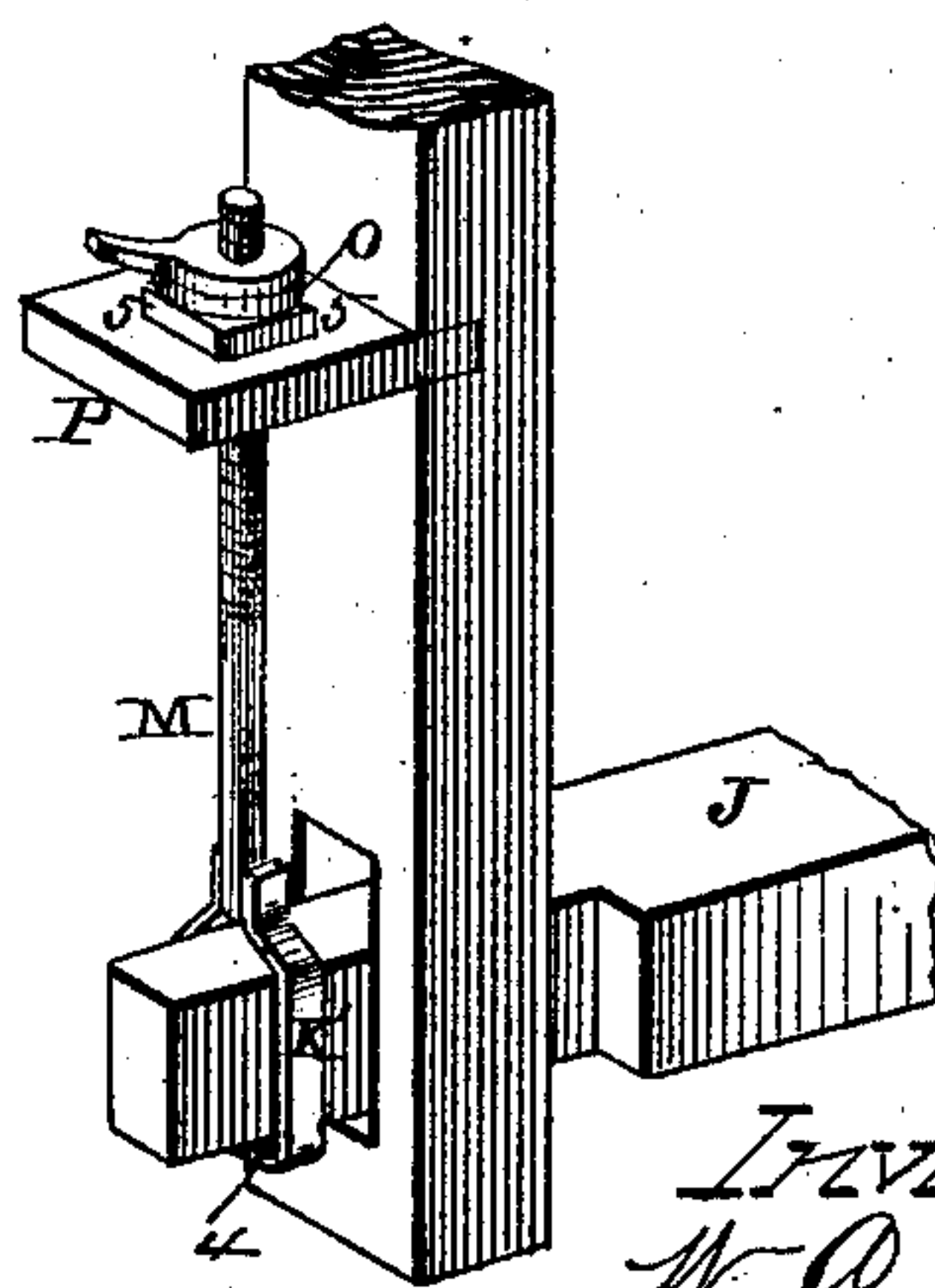


Fig. 4.



Witnesses

Wm. W. Mortimer,

Harry Lushington,

Inventor

W. C. Hale,

per

F. A. Lehmann,
Atty

(No Model.)

3 Sheets—Sheet 3.

W. C. HALE.
Mounting Millstones.

No. 237,268.

Patented Feb. 1, 1881.

Fig. 5.

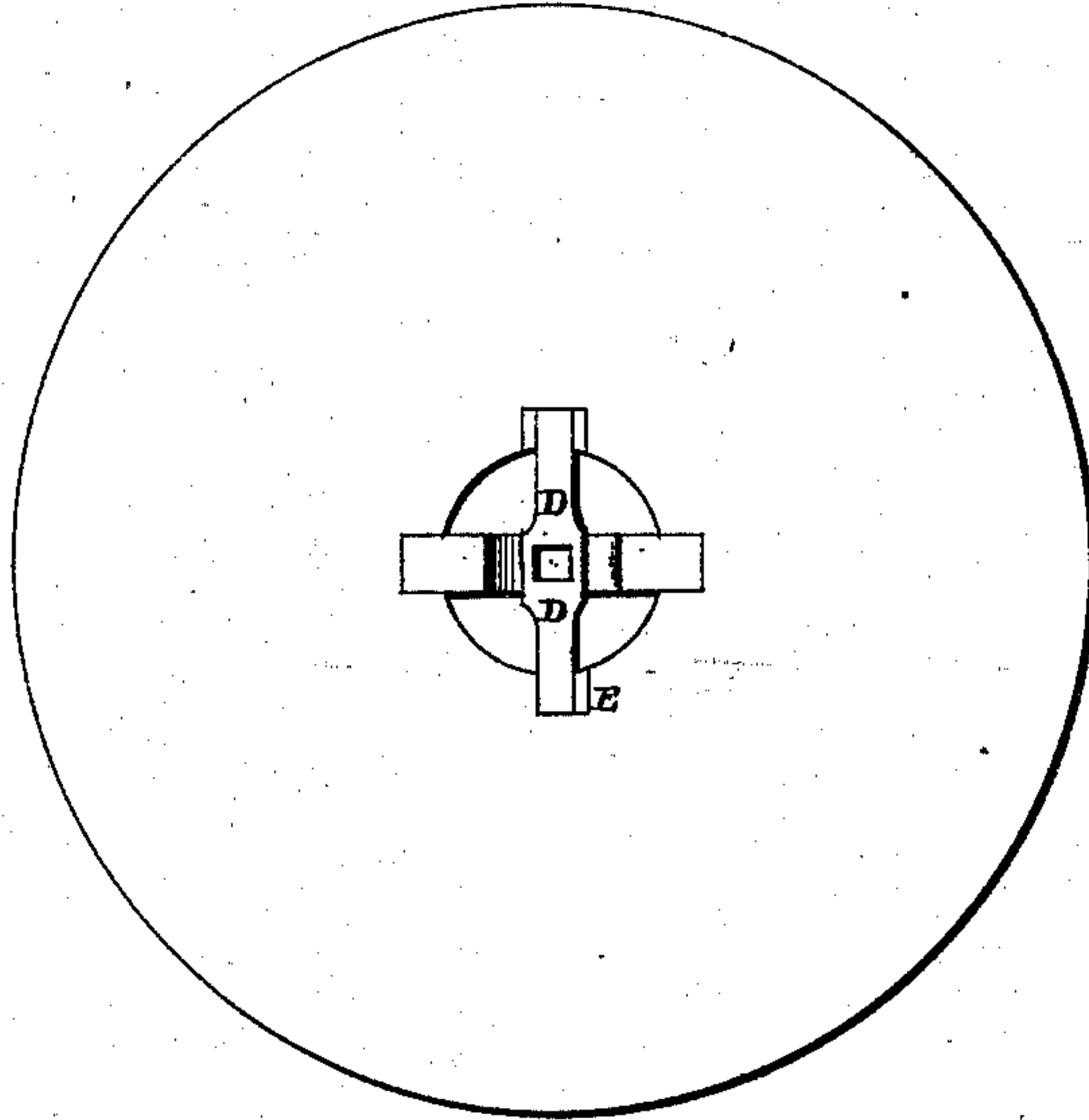
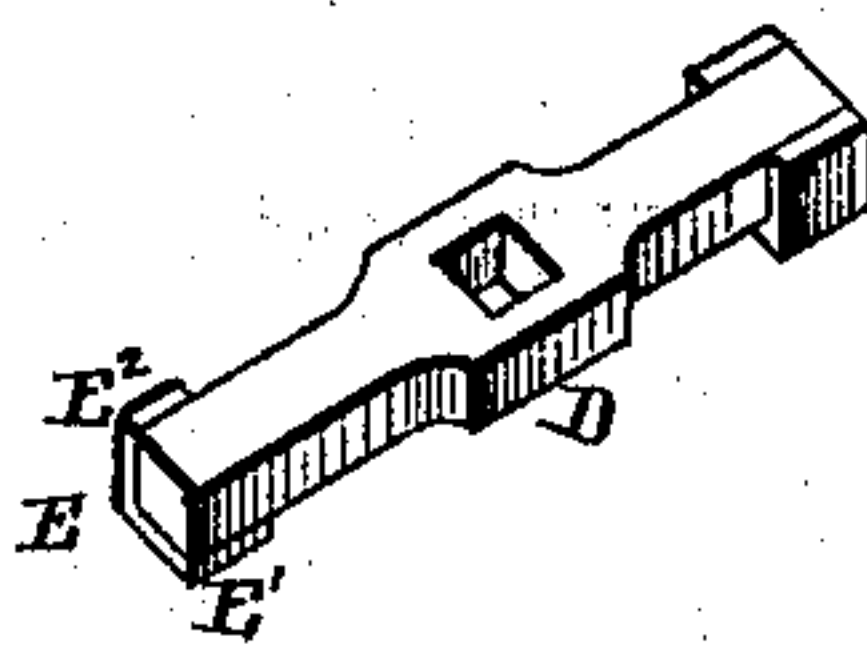


Fig. 6.



—WITNESSES—

Wm. McMorris

H. H. Cushing

—INVENTOR—

W. C. Hale,
per

F. A. Lehmann,
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM C. HALE, OF JOHNSON CITY, TENNESSEE.

MOUNTING MILLSTONES.

SPECIFICATION forming part of Letters Patent No. 237,268, dated February 1, 1881.

Application filed November 19, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. HALE, of Johnson City, in the county of Washington and State of Tennessee, have invented certain
5 new and useful Improvements in Mounting Millstones; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to
10 make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in mounting millstones; and it consists in applying a peculiarly-constructed gum spring to the
15 runner to receive the pressure of the driver, in combination with springs or cushions applied, as hereinafter described, to all the bearings, supports, and levers that sustain the
20 weight and hold in position the said runner and its spindle. These yielding supports consist, first, of elastic pads of any convenient or desired form, composed of india-rubber in any of its
25 other similar or suitable material appropriate for the formation of elastic yielding pads; and, second, of coiled or elliptical springs composed of iron or steel or other suitable metal. For the application of these elastic pads or springs,
30 in addition to that between the driver and running-stone, as above said, I designate the following arrangements and locations: first, under the ink-bearing that supports the spindle or upright shaft on which the running burr
35 is pivoted and balanced, the pad or spring resting on and in a recess in the central part of the bridge-tree; second, a pad or spring is interposed between the mounted end of the bridge-tree and tomkin-post; third, a pad or
40 spring is interposed between the adjusting end of the bridge-tree and the bray-plank; fourth, a pad or spring is adjusted under the bearing of the tempering screw or screws which support the movable end of the bray-plank or bridge-tree, or if, in lieu of a tempering-screw, a lighter-shaft be employed, a pad or
45 spring is placed under the end of the bray-plank and on the lower inner side of the stirrup or screw which couples the lighter staff or
50 screw to the bray-plank; fifth, a spring or pad

is interposed between the fulcrum which supports the lighter-shaft and that part of said staff resting and pivoted on said fulcrum. In short, I commence with the running-stone and the ink which supports the spindle-shaft, and
55 thence outward to the end of the lighter-shaft or bearing of the tempering-screws. At each point of bearing or pressure or transfer of the weight I interpose a spring or elastic pad, and I make such specific designations, so as not
60 only to apply to the place of supports now in use, but to any convenient change of place hereinafter to be adopted. The object in making all these places of support yielding or elastic is to avoid all hard and sharp friction between the faces of the running and stationary
65 burrs.

It often happens that the grain becomes clogged, though it may be but slightly, at a given point between the burrs, and the centrifugal force of the runner throws and presses the opposite part of the runner's face so severely on the face of the stationary or bed stone as to injuriously cut and pulverize the bran and darken and kill the flour. My arrangement of elastic pads or springs applied
75 to each and every one of the joints of the mechanism which supports the runner effectually prevents all such damaging blows being given, and, since every joint is padded, there can not
80 only be no jars communicated from the balancing mechanism, but there can be none created.

The invention compensates largely, if not perfectly, for the variation in the length of the spindle-shaft by contraction and expansion incident to extreme cold and heat, such changes
85 only causing an apparent change in the weight of the running-stone—under contraction of the spindle a seeming increase and under expansion of the spindle a seeming decrease in the weight of the stone. My improvement, by equalizing and softening the running action, avoids injurious friction between the stones.

I apply an elastic cushion to the bushing that surrounds the collar of the spindle, and
95 which holds it to its proper central place. For this purpose I use an inner bushing, preferably of metal, cut on one side or divided into two or more sections, so as to be adjustable to the spindle, and on the outer side of the said
100

inner bushing I apply a tubular rubber spring or series of springs, surrounded by any desired number of radial wedging-keys, adapted to be tightened as required. The inner bushing of metal is surrounded with an intervening lining of felting or other suitable fibrous material, so as to prevent the heating of the metallic bushing from being injuriously communicated to the rubber. This construction of bushing holds the spindle more closely and accurately in central place, and at the same time allows a soft vibration in harmony with the elastic supports of the frame-works below that effectually cures or prevents jarring. The result of the action of these improvements, as described, gives such easy uniformity to the action of the burrs that the same amount of work can be done with much less power and a closer and thorough pulverization of the grain is effected without injuriously cutting the bran or heating the flour, thus rendering the yield of the flour from four to five per cent. greater and the flour much whiter and more lively than the best products obtainable without my improvement.

In the accompanying drawings, Figure 1 is a perspective view of a run of stones and the frame-work in which the running-stone is mounted and supported in accordance with my invention. Fig. 2 is a vertical section of the same. Fig. 3 is a horizontal section of the bushing of the spindle on a larger scale. Fig. 4 is a perspective view, illustrating a modification in the mode of supporting the end of the bray-plank. Fig. 5 is a plan view of the runner with parts broken away to show the mode of applying my peculiar L-shaped driver-cushions. Fig. 6 is a perspective view of one of the L-shaped cushions applied to the end of the driver.

A A represent parts of the stationary frame supporting the bed-stone B. S represents the runner, driven by a spindle, S', in customary manner, said spindle passing through a compound bushing, C, in the bed-stone, the construction of which is shown in Fig. 3. It consists, essentially, of an inner bushing, T, made in the form of a tube cut at one side, surrounded by a cylindrical cushion, U, of rubber, which may be made in one or more parts. Any necessary number of keys V V V are arranged around the gum springs or cushions U. These may be driven as required to increase the pressure of the springs U and keep the inner bushing, T, snugly against the spindle or against the collar surrounding the same. A packing, W, of wool, felt, or other fibrous material, is interposed between said inner bushing and the gum spring or cushion to prevent the transmission of heat from the inner metallic bushing to the gum.

D in Figs. 2 and 5 represents a driver applied to the spindle S' in the usual way.

E, Figs. 5 and 6, is my peculiar L-shaped gum spring or cushion, fitted within recesses prepared for it within the runner S, so as to

receive the working pressure of the driver on its thicker and more elastic portion E², and resting, by its thinner horizontal part E', on the top of the driver D, so as to be secure against displacement.

G represents the ink-bearing of the spindle, supported by a spring-cushion, 1, resting in a recess in the bridge-tree H. 2 represents the cushion on which the fulcrum end of the bridge-tree rests within the tomkin-post I.

3 is the cushion which supports the adjusting end of the bridge-tree on the bray-plank J.

4 is a pad or cushion on which the moving end of the bray-plank rests within the stirrup K or K', connected with the lighter-staff L or tempering-screw M, as the case may be. If the tempering-screw M be used, its nut N rests on a cushion, 5, beneath its washer O, on the lug or bracket P, as illustrated in Fig. 4. If the lighter-staff L be used, as shown in Fig. 1, a pad or cushion, Q, is interposed between the said lighter-staff and its fulcrum-plate.

R R' represent cushions of rubber interposed between the vertical shoulders of the bridge-tree at each end and the tomkin-post I and bray-plank J, respectively, for the purpose of taking up horizontal shocks, preventing the end motion and jarring of the bridge-tree, and thus causing the mill to run with greater steadiness.

I have found by inserting cushions throughout the balancing mechanism of a run of stone, as herein described, that several distinct advantages are obtained:

First, durability and ease of motion are enhanced by the entire prevention of all shocks or jars.

Second, it will be seen that from the balance-rynd to the lighter-staff each successive pad supports only a fraction of the burden supported by the preceding pad, so that there may be such a gradation in the delicacy of the yielding supports that, should those springs nearest the runner become deadened from too much pressure or otherwise, the elasticity of the more delicate succeeding springs will be drawn on automatically to take their place.

Third, all unnecessary friction is done away with.

On account of the deadening or wearing out of the pads I have found it necessary to provide keys V, whereby the pressure on the journal may be restored or increased, as desired.

I am aware that elastic cushions have been used in connection with the ink-bearing, the cock-head, and the bed-stone; but none of these effect the desired result.

I am also aware that elastic bushings have been used for the spindle, and such I do not claim, broadly.

Having thus described my invention, I claim—

1. In a grinding-mill, the combination, with the running-stone and its supporting, adjusting, and driving devices, substantially as here-

in described, the combination of the L-shaped
spring or cushion E, the supporting-pads 1, 2,
3, 4, and 5, and the supplemental cushions R
R', operating to prevent endwise shock, as and
5 for the purpose explained.

2. The combination of the inner bushing, T,
non-conducting packing W, spring or springs
U, and keys V, substantially as and for the
purposes set forth.

In testimony that I claim the foregoing I do
have hereunto set my hand this 11th day of
November, 1880.

WILLIAM CARTER HALE.

Witnesses:

M. F. HICKEY,

W. S. HICKEY.