H. KNOWLES.

Mill Bush.

No. 6,039. Patented Jan'y 16, 1849.

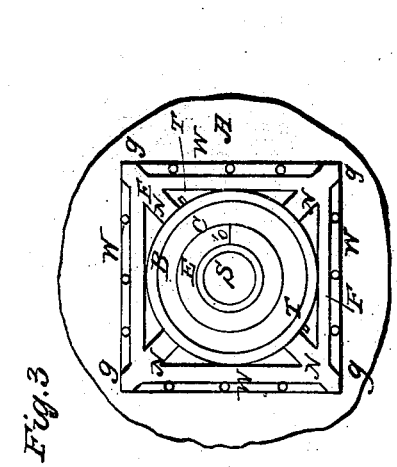

Fig. 3

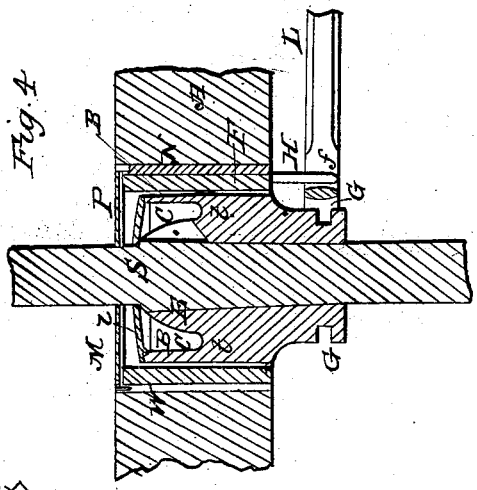

Fig. 4

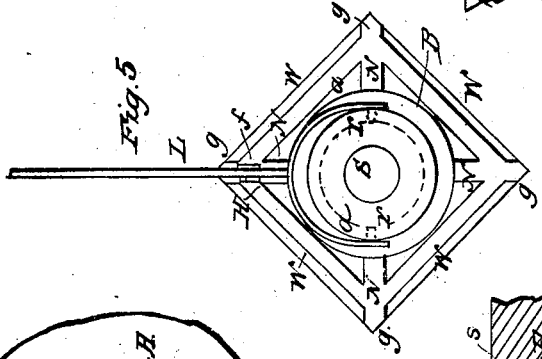

Fig. 5

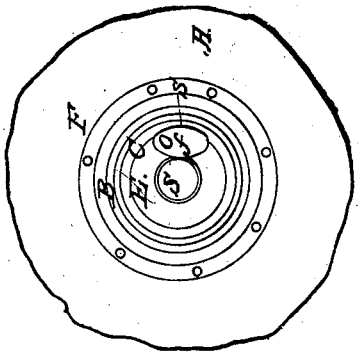

Fig. 1

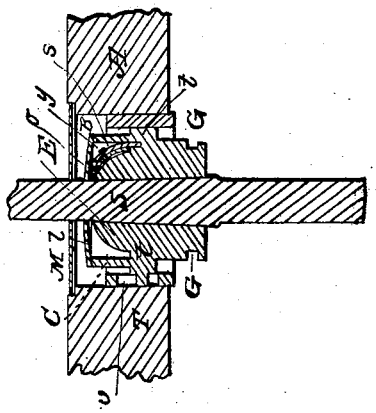

Fig. 2

UNITED STATES PATENT OFFICE.

HAZARD KNOWLES, OF WASHINGTON, DISTRICT OF COLUMBIA.

MILL-BUSH.

Specification of Letters Patent No. 6,039, dated January 16, 1849.

To all whom it may concern:

Be it known that I, HAZARD KNOWLES, of the city and county of Washington and District of Columbia, have invented a new and useful Mill-Bush, and that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which make a part of this specification.

The purpose of my invention is to furnish a bearing for upright-shafts which shall, at all times, keep the joint lubricated, prevent access of dust and insure constantly, the proper contact between the bearing and the neck of the shaft which runs in it;—as well as allow for such slight deviations from the perpendicular position of the shaft or spindle, as are found unavoidable in practice. The bush must also admit the spindle to be raised or lowered to a certain extent to allow for coarser or finer grinding and for the gradual wearing away of the stones.

I am aware that numerous attempts have been made to effect these different purposes, but in such ways as to leave some one or more of the conditions unattained. The manner in which I accomplish the object is to place within the cavity or eye of the lower millstone A, Figures 1, 2, 3 and 4, a frame F which may be either circular as in Figs. 1, and 2, or a square box or skeleton, as in Figs. 3, 4, and 5. This frame is set in the stone and secured by wooden wedges, as seen at *w*, *w*, &c., Figs. 3, and 4. When circular, this frame is turned to a true cylinder within, and when square, the wings or flanches N, N, N, N, (Fig. 3,) are dressed off on their inner edges, to allow the bush B to slide vertically up and down between them. Whether one or the other form of the frame F be adapted, the action of the bush will be essentially the same;—the square form presents some advantages, for supporting it on the projecting corners *g*, *g*, *g*, *g*, and also for securing it by the wedges *w*, *w*, for which reasons I generally prefer this form. The bush B has its vertical sides reduced to a flanch-like projection, as *t*, *t*, Fig. 2, or turned into a spherical segment, *t'*, *t'*, Fig. 4, which forms allow the bush to accommodate itself to any slight deviations from a vertical position in the spindle S.

As the spindle S turns within the bush B,—in order to insure contact between them, while allowing for the wearing away by friction, and thereby to maintain steadiness in the shaft, S, the latter is turned slightly coning, as seen in Figs. 2 and 4, and the bush is bored with a like cone-form—the larger or smaller base of the frustum of cone being downward at pleasure. When the spindle is enlarged downward, as in Fig. 2, the bush B sliding freely in the frame F, might be in danger of becoming too tightly pressed down upon S; to prevent which, the circular groove G is turned near the lower edge to receive the projecting pins *r*, *r*, from the arms *a*, *a* of the balance lever L (Fig. 5), which lever has its fulcrum at *f* in the lower part of the hanger H (Figs. 4 and 5).

When the spindle is coning downward, as in Fig. 4, the bush might by its own weight drop away from its true position. In this case, the balance lever has just power enough to sustain the weight of the bush keeping it up to its true and proper bearing, but not producing any undue friction.

The bush B has in its upper part, a cup shaped cavity *c* for retaining oil or other lubricating material, the inner edge E of the cup forming a part of the bearing around the spindle S. This cup is covered by the lid *l* which fits closely around the spindle S, and serves to keep out dust and other impurity from the oil. At some distance above *l*, is the cloth or felt cover P under the metallic plate M, forming a species of packing around the spindle as well as about the periphery of the eye of the stone A. When the eye is square the metallic plate M is screwed down to the wedges *w*, *w*, *w*, *w*, Figs. 3, 4 and 5, which wedges also confine the frame F in its place.

The manner in which the lubrication of the bearing between the bush and spindle is effected is seen at *o*, Figs. 1 and 2; or at *o'* Figs. 3 and 4. In the former a spring *s* is made fast in the lower part of the cup C, and, near its upper end, is traversed by a pivot which also passes through and supports the small cup *o*, leaving it free to revolve about *y*, as its axis. By the revolution of the spindle S, its friction against the upper edge of *o* sets the latter in motion and its lower edge dips constantly in the lubricating material contained in the cup C and brings it up adhering by capillary attraction. In the latter mode of applying the lubricating material a thin slot *o'*, is made in the inner border of the cup E, through which the oil or other lubricating material is allowed to pass to the spindle S when in

motion, but as the coning form of the spindle and bush constitute a joint like that of a stop-cock, no liquid will pass when the spindle is at rest.

In order that the bush B may not turn with the shaft S, a pin T is inserted on one side (or on more than one, when necessary) to work up and down in a vertical slot U Fig. 2; or when the square frame is used, they may act against two or more of the corner flanges N, N, Fig. 3. Instead of the frame F to support the bush, it may have projecting wrists near the top, resting in suitable bearings in a counterpoising frame susceptible of slight vertical movements, or on the two arms of a forked lever. This arrangement will be more particularly applicable to vertical shafts of considerable length extending from floor to floor of a high building, but is not equally suitable to a common mill spindle.

What I claim as new and desire to secure by Letters Patent is—

1. The constructing and arranging the bush for a vertical spindle or shaft in such a manner that it will perfectly adjust itself to the bearing surface of the spindle or shaft as it or the bush wears away by friction, by making the bearing surface of the spindle or shaft and the aperture in the bush for its reception of a corresponding conical form, and so fitting the bush into a supporting frame that it may have free vertical play therein and be kept in a proper position for bearing upon the spindle or shaft with the requisite force by means of levers and weights or their equivalents, substantially as herein set forth.

2. I also claim in combination with a conical self adjusting bush for vertical shafts or spindles, the oil cup having inclined revolving lubricators, whereby the necessary quantity of lubricating material is supplied to the bearing in the manner herein set forth. I also claim in combination with a bush-frame or cylindrical inclosing support the use of bushes or bearings for vertical shafts or spindles with slightly spherical exterior zones, to traverse the interior of the vertical frame whereby trifling deviations from a perpendicular position in the spindle may take place without danger of deranging the supporting frame, or the closing plate of the bush that secures the oil from dust, in the manner herein set forth, not intending in these claims to limit myself to the precise arrangements described but to vary them at pleasure while I attain the same ends by means substantially the same.

HAZARD KNOWLES.

Witnesses:
W. R. JOHNSON,
A. STEINWEHR.