No. 801,592. PATENTED OCT. 10, 1905.

L. HUNT & W. W. WHEELER.

PULVERIZING CENTRIFUGAL MILL.

APPLICATION FILED SEPT. 15, 1904.

2 SHEETS—SHEET 1.

Fig. 2.

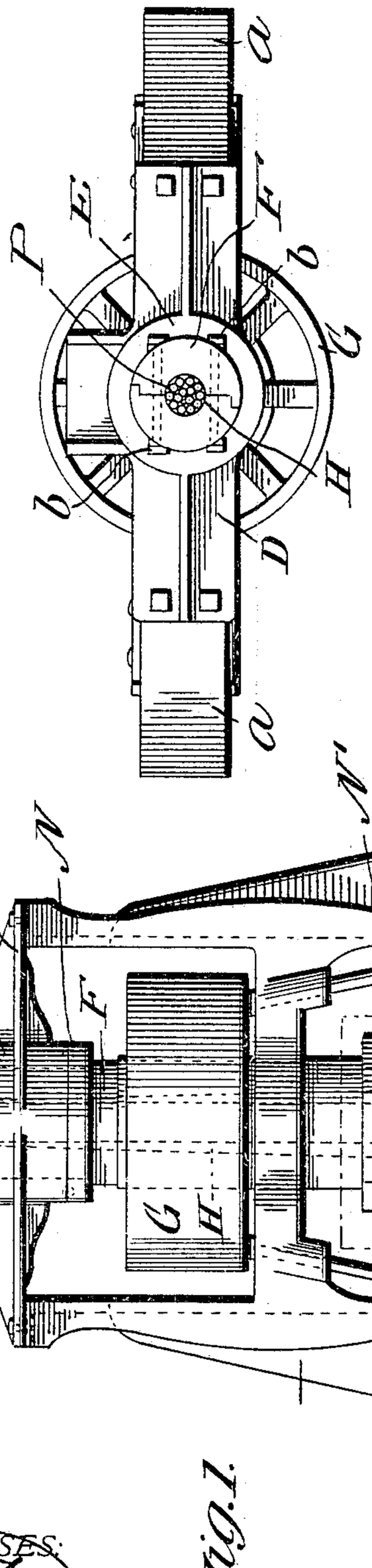

Fig. 3.

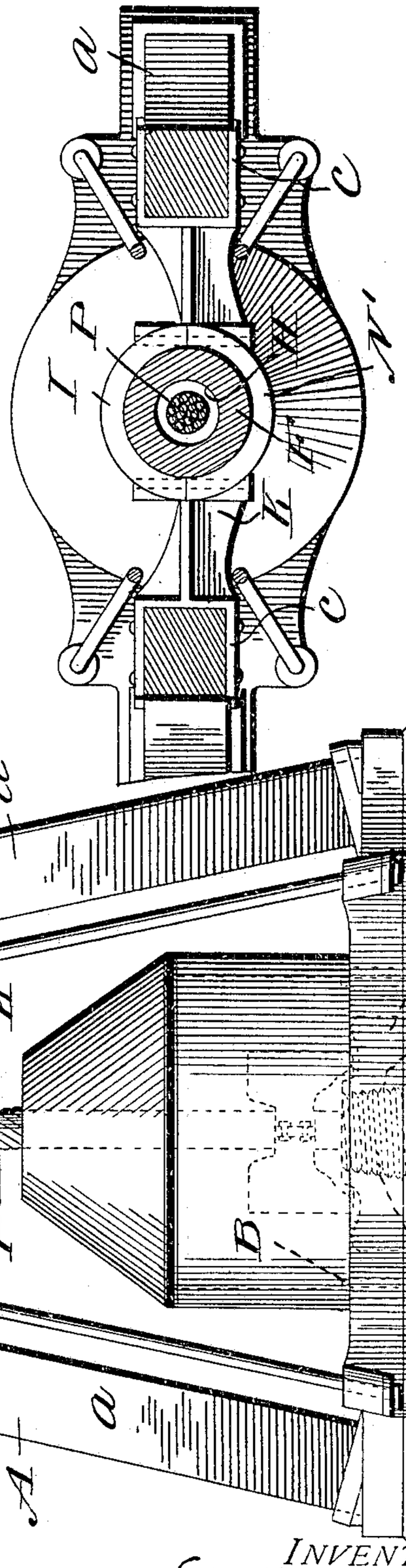

Fig. 1.

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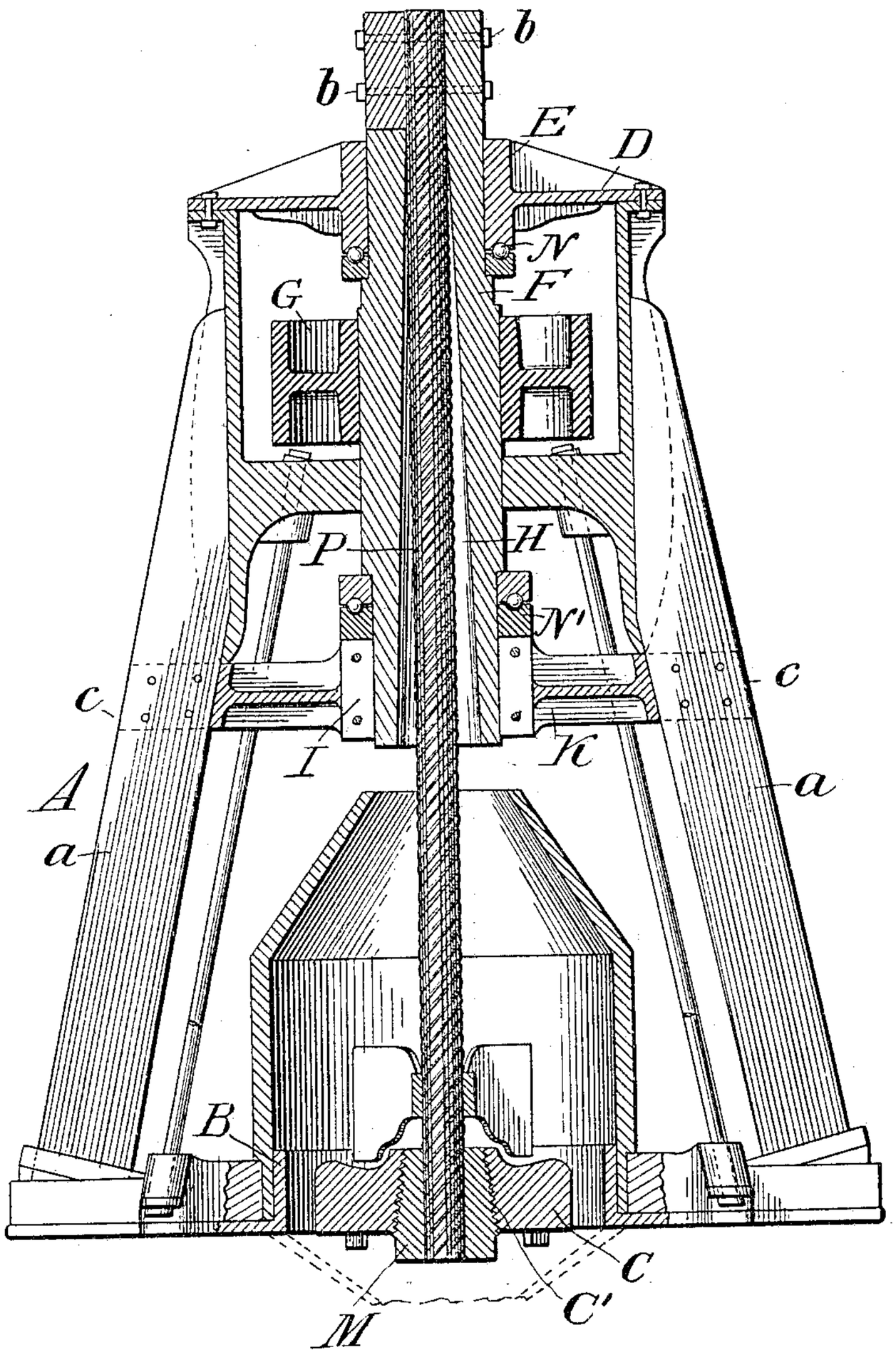
2 SHEETS—SHEET 2.

Fig. 4.



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UNITED STATES PATENT OFFICE.

LEIGH HUNT AND WALTER W. WHEELER, OF IOLA, KANSAS.

PULVERIZING CENTRIFUGAL MILL.

No. 801,592. Specification of Letters Patent. Patented Oct. 10, 1905.

Application filed September 15, 1904. Serial No. 224,625.

To all whom it may concern:

Be it known that we, LEIGH HUNT and WALTER W. WHEELER, citizens of the United States, residing at Iola, in the county of Allen and State of Kansas, have invented new and useful Improvements in Pulverizing Centrifugal Mills, of which the following is a specification.

This invention has relation to that class of pulverizing-mills in which the material is crushed by the impact of the periphery of the crushing-roll upon the inner surface of an annular die or ring, the roll being held in contact with said die or ring by centrifugal force when the mill is in operation. In mills of this type it has been customary to support the crushing-roll upon the lower end of a vertical shaft, the upper end of the shaft being connected by a universal joint or flexible coupling to the hub of the driving-pulley, the roll being thus allowed to swing or gyrate around the central axis of the shaft and roll or press against the inner surface of the annular die or ring with a degree of pressure proportionate to the centrifugal speed.

The object of this invention is to provide a roll-shaft of novel construction whereby the universal joint or coupling heretofore employed is dispensed with, the structure and arrangement of the mill simplified, and the roll-shaft and connections materially strengthened.

To this end the present invention consists, first, in the provision, in a crushing-mill of the general type under consideration, of a roll-shaft composed of a section of wire cable, and, second, in the combination, with the other working parts of a mill and the wire cable or flexible roll-shaft, of special devices for the advantageous mounting of the latter, all as hereinafter described and claimed.

In the accompanying drawings, illustrating a mill embodying our invention, Figure 1 is a side elevation of the mill. Fig. 2 is a plan view, and Fig. 3 is a horizontal section on the line *x x* of Fig. 1. Fig. 4 is a vertical cross-sectional elevation of the mill.

Referring to the drawings, A designates the supporting-frame, of any suitable form; B, the die or ring upon the inner surface of which the material is crushed by the impact and pressure of the roll C.

The side bars *a a* of the frame A are connected at the top by the casting D, which is formed with a central boss E, bored vertically to form a bearing for the reception of the "quill" F, which rotates in said bearing, power being applied through the horizontal pulley G, keyed to the quill below the bearing bar or yoke D.

The quill F is a metallic tube and in a mill of standard size adapted to pulverizing cement materials is about sixty-seven and one-half inches ($67\frac{1}{2}''$) in length and of varying external diameter by reason of being stepped or tenoned to form journals at its ends, its diameter being about eleven inches (11″) at its upper end and eleven and three-quarter ($11\frac{3}{4}''$) inches at its lower end. These proportions, however, are not material. The quill has a central bore H, which is of uniform diameter—say four inches (4″) from its upper end for a distance of eleven inches, (11″,) from which point it tapers or flares to seven and three-quarter inches ($7\frac{3}{4}''$) diameter at its lower end. The upper end of the quill is split for eleven inches, (11″,) and the two sections are secured together by bolts *b b* and upon being clamped act as a grip for the cable, which turns with the quill. The lower end of the quill has its bearing in the lower bearing-plate K of the frame A, said plate being forked or U-shaped at its ends, as shown at *c c*, to embrace the side bars *a a* of the frame to which it is bolted. The bearing-plate K is bossed and bored centrally and is provided with an eleven-and-three-quarter-inch ($11\frac{3}{4}''$) split bearing I for the lower end of the quill.

Attached to the lower end of the cable is a twenty-four-inch (24″) roll-body C, through which is a tapered hole C′, five inches (5″) in diameter at the lower end, cut with a left-hand screw-thread, into which screws a split nut M, acting as a clamp to the lower end of the cable. The quill is held in place by the two ball-bearing thrust-collars N and N′, respectively, one against the upper side of the lower bearing-plate K and the other against the lower side of the top bearing-plate D.

P designates the flexible shaft constituting the principal feature of the invention and consisting of a wire cable of, say, four inches (4″) in diameter, although this size is not essential to the invention, preferably formed with a central core of straight or twisted wire to give the proper amount of flexibility and strength. The ends of the cable are securely fastened to the quill and to the roll-body by means of the split end section and the split nut, as described, and the cable and the roll-body rotate with the quill.

The employment of the flexible cable does

away with the solid shaft, which it replaces, and prevents breakage throughout the mill, and especially of the solid shaft and its contiguous parts, and simplifies the construction of the mill. The shaft is protected for the greater portion of its length by the quill. The ends of the cable may be brazed or soldered together, forming a solid mass, which may be rounded and trued to fit the sockets into which they are fitted, and will assist in fastening the quill and roll-body to the shaft. Such a cable will not elongate more than three inches in ten feet, which amount may be provided for in the construction of the mill. It will resist intense torsional strain with no buckling and practically no shortening of the shaft. The inner core of straight or twisted wire limits the degree of flexibility, and there is no tendency of the shaft to wind up and unwind in starting and stopping the mill.

Having fully described our invention, its construction and operation, we claim and desire Letters Patent upon the following:

1. In a pulverizing or crushing mill, a roll-shaft consisting of a cable made of wire twisted into strands, having a core of straight or twisted wires, and having the ends of said wires brazed or soldered together, forming a solid mass, in combination with a roller-body, fastened thereto by a split nut, and a split driving-member suspension.

2. In a pulverizing or crushing mill, a roll-shaft consisting of a cable made of wire of suitable size and strength twisted into strands forming a cable of proper diameter, in combination with a roller-body fastened thereto at its lower end, and a metallic tube or quill, having an internal bore to correspond with the curve or angle taken by the shaft when rotating; said shaft being suspended from said quill at its upper end, and rotating with said quill.

3. In a pulverizing or crushing mill, the combination of a split driving-member suspension, a flexible wire-cable roll-shaft and a roller-body fastened thereto at its lower end by a split nut, substantially as described.

In testimony whereof we affix our signatures in presence of two subscribing witnesses.

LEIGH HUNT.
WALTER W. WHEELER.

Witnesses:
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J. G. MITTELBACH.