

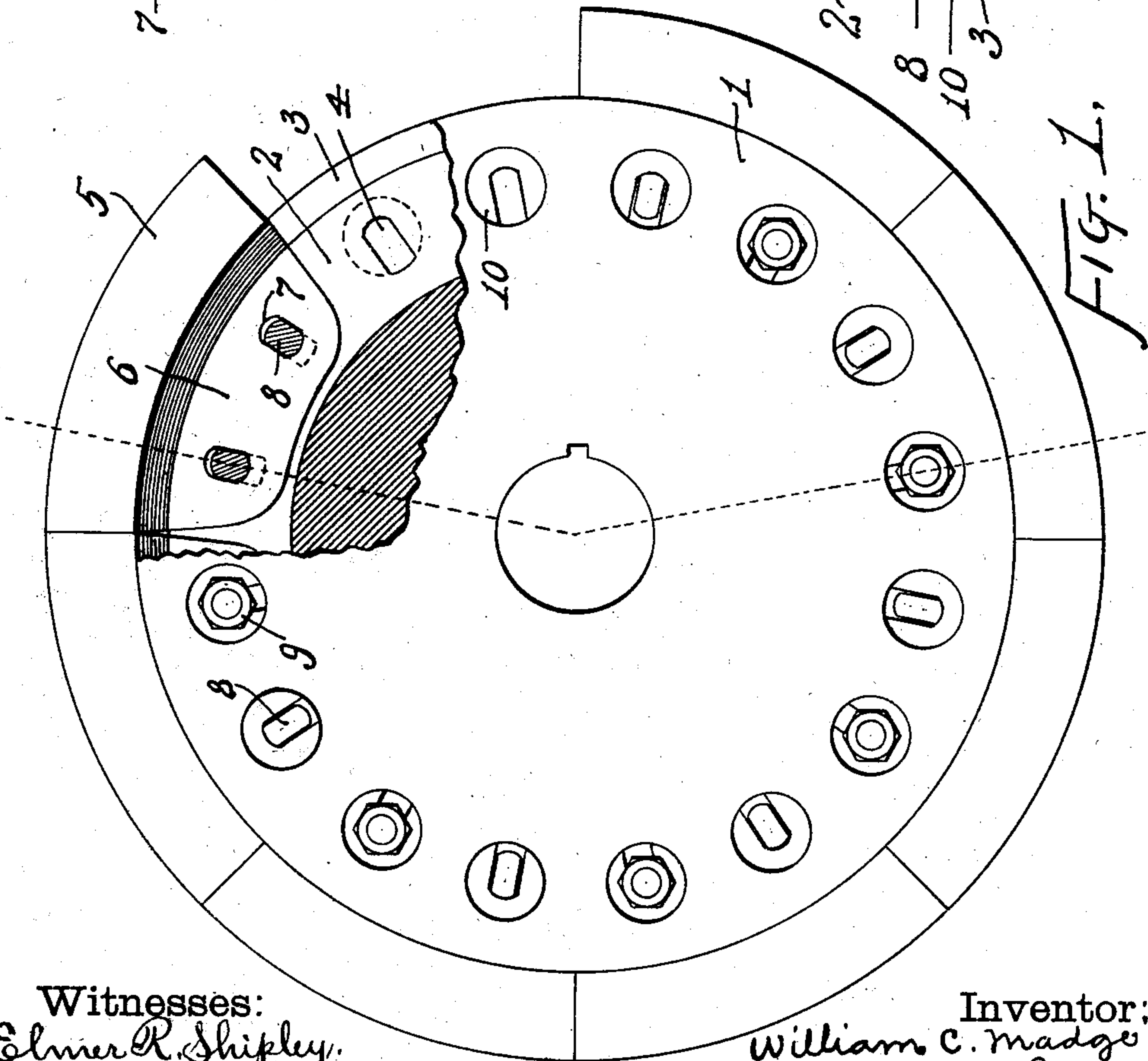
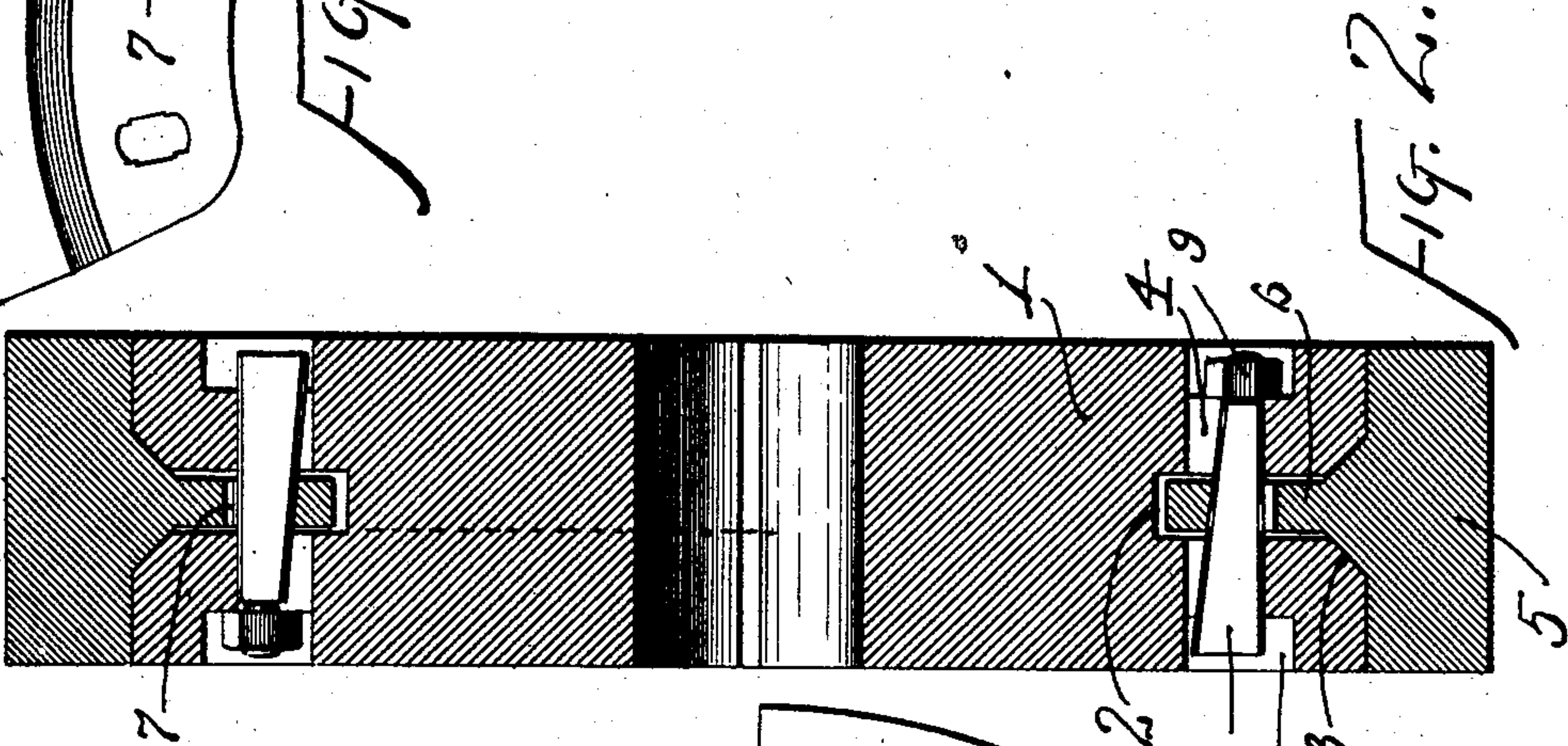
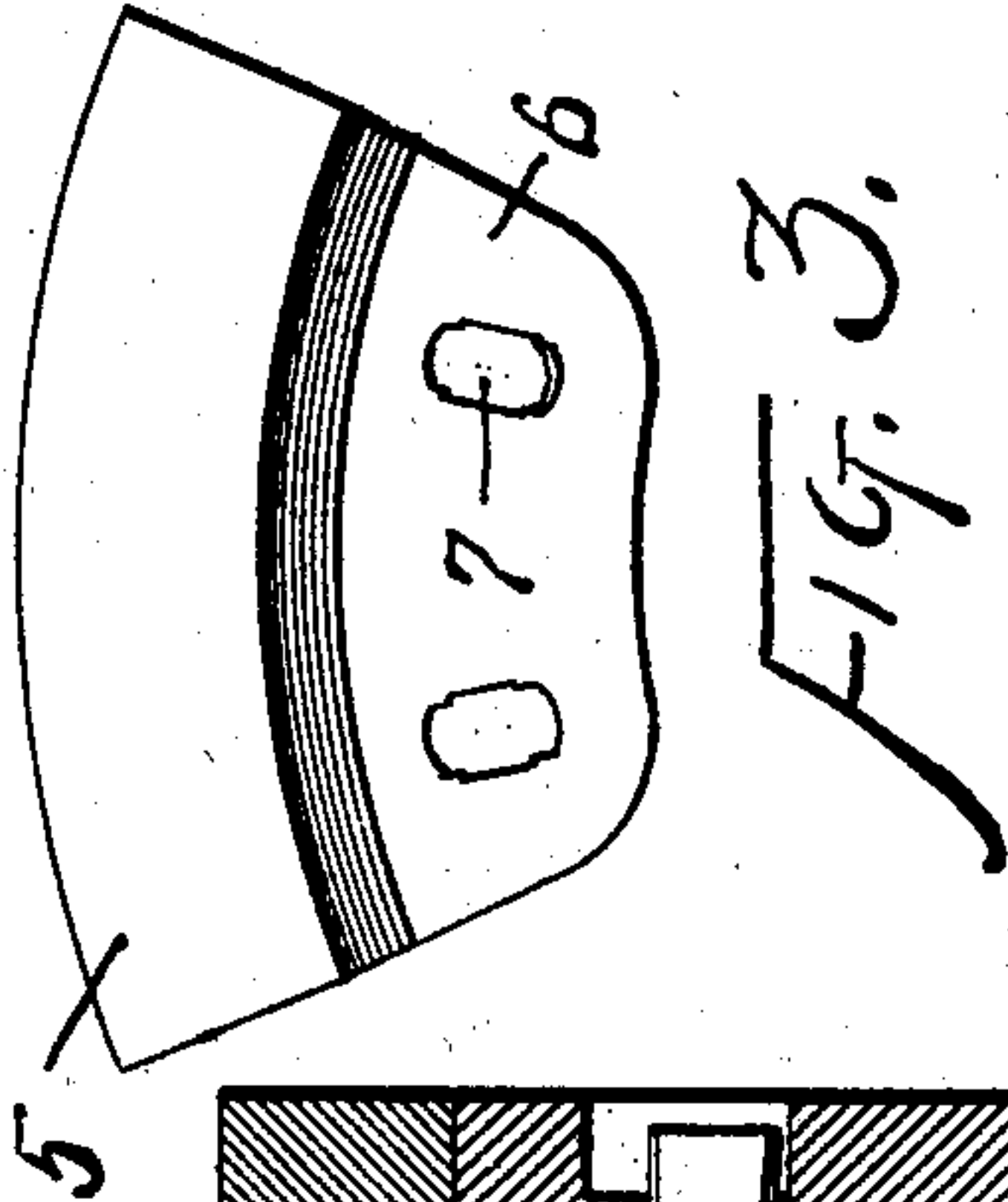
No. 721,208.

PATENTED FEB. 24, 1903.

W. C. MADGE.  
CRUSHING ROLL.

APPLICATION FILED DEC. 21, 1901.

NO MODEL.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

WILLIAM C. MADGE, OF ANACONDA, MONTANA.

## CRUSHING-ROLL.

SPECIFICATION forming part of Letters Patent No. 721,208, dated February 24, 1903.

Application filed December 21, 1901. Serial No. 86,814. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM C. MADGE, a citizen of the United States, residing at Anaconda, Deerlodge county, Montana, (post-office address Anaconda, Montana,) have invented certain new and useful Improvements in Crushing-Rolls, of which the following is a specification.

This invention pertains to improvements in crushing-rolls for ore-mills and the like, particularly to rolls of that class in which the active peripheral surface is formed of separably attached segments or shoes, and my improvement relates to the manner of uniting the shoes to the core of the roll.

My improvements will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a face view of a crushing-roll exemplifying my invention, one of the segments or shoes being omitted and portions of the roll appearing in vertical section; Fig. 2, a vertical substantially diametrical section of the same, and Fig. 3 a face view of one of the separate shoes.

In the drawings, 1 indicates the core of the roll, its periphery being preferably circular, as shown; 2, a deep peripheral groove therein; 3, a beveled throating formed at the outer portion of the groove by suppressing the corners otherwise formed by the side walls of the groove and the periphery of the core; 4, a series of transverse openings or mortises through the core at such radial distance from the center of the core that their axial lines will cross the groove 2 at some distance from the bottom of the groove, there being a pair of these mortises for each of the separate shoes with which the core is to be armed, the illustration showing a roll having eight shoes; 5, the segments or shoes each of which has a segmental outer surface and an inner surface adapted to nicely fit the periphery of the core, the circumferential length of the individual segments being such that when arranged in circumferential series around the core they will not make such end engagement with each other as to prevent the inner surfaces of the shoes coming down solidly upon the core; 6, a flange projecting inwardly from each shoe and adapted to freely enter the groove 2 in

the core, the corners at the juncture of the flange with the shoe being provided with fillets adapted to properly fit the beveled throat 3 of the groove in the core; 7, mortises through the flanges of the shoes in line with the mortises 4 through the core, the outer and inner margins of these shoe-mortises being disposed farther outwardly than the corresponding margins of the core-mortises; 8, wedge-shaped keys passing through the mortises in the core and shoes and engaging the outer margins of the core-mortises and the inner margins of the shoe-mortises; 9, nuts screwed on the smaller ends of these keys, and 10 counterbores at the core-mortises at each side of the core of a size sufficient to house the nuts 9 and permit the use of a proper wrench upon the nuts.

In assembling the roll a shoe is put in place and then the keys inserted and firmly driven, after which the nuts are placed upon the keys, and so on with all the shoes till the roll is complete. In removing the shoes the operation is reversed—that is to say, the nuts are removed and the keys driven out. It is to be observed in the drawings that of the two keys in any given shoe one key goes in from one side of the roll, while the other goes in from the opposite side. This is advantageous in equalizing the side strains upon the flanges of the shoes, for if both keys in a shoe were driven in the same direction they would aggregate a side strain upon the flange. The core-mortises being counterbored at both sides of the core permits of the nuts of the keys being at either side, and the idle counterbore thus resulting at the head end of a key gives room for a hammer or a set in driving the key and also makes room for such upsetting of the head of the key as is very apt to occur.

The flanges of the shoes fit freely sidewise in the groove of the core, and the beveling of the outer portion of the groove in conjunction with the beveled filleting of the shoes prevents any transverse movement of the shoes upon the core.

I claim as my invention—

1. In a crushing-roll, the combination, substantially as set forth, of a core provided with a continuous peripheral groove and with a circular series of transverse mortises crossing the groove, a series of shoes engaging the pe-



riphery of the core and free of initial end contact with each other and provided with mortised flanges engaging the groove of the core, and tapering keys extending through the mortises of the core and shoes and engaging the inner end walls of the mortises in the shoes and the outer walls of the mortises of the core and clearing the inner walls of the mortises of the core and the outer walls of the mortises of the shoes.

2. In a crushing-roll, the combination, substantially as set forth, of a core provided with a continuous peripheral groove and with a circular series of transverse mortises crossing the groove, a series of shoes engaging the periphery of the core and free of initial end contact with each other and provided with mortised flanges engaging the groove of the core, and tapering keys extending through the mortises of the core and shoes there being a key at each end of each shoe, and the two keys being tapered in relatively opposite directions.

3. In a crushing-roll, the combination, substantially as set forth, of a core provided with a continuous peripheral groove having a continuous beveled throat and with transverse mortises crossing the groove inwardly beyond the throat, a series of shoes engaging the periphery of the core and provided with mortised and filleted flanges engaging the groove of the core, and tapering keys extending through the mortises of the core and shoes.

4. In a crushing-roll, the combination, substantially as set forth, of a core provided with

a continuous peripheral groove and with a circular series of transverse mortises crossing the groove, a series of shoes engaging the periphery of the core free of initial end contact with each other and provided with mortised flanges engaging the groove of the core, tapering keys extending through the mortises of the core and shoes, and nuts upon the smaller ends of said keys.

5. In a crushing-roll, the combination, substantially as set forth, of a core provided with a continuous peripheral groove and with a circular series of counterbored transverse mortises crossing the groove, a series of shoes engaging the periphery of the core and provided with mortised flanges engaging the groove of the core, tapering keys extending through the mortises of the core and shoes, and nuts upon the smaller ends of said keys.

6. In a crushing-roll, the combination, substantially as set forth, of a core provided with a continuous peripheral groove and with a circular series of transverse mortises crossing the groove counterbored at both faces of the core, a series of shoes engaging the periphery of the core and provided with mortised flanges engaging the groove of the core, tapering keys extending through the mortises of the core and shoes, and nuts upon the smaller ends of said keys.

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Witnesses:

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