

W. C. BURCH.

Drills for Drilling Metals.

No. 134,355.

Patented Dec. 31, 1872.

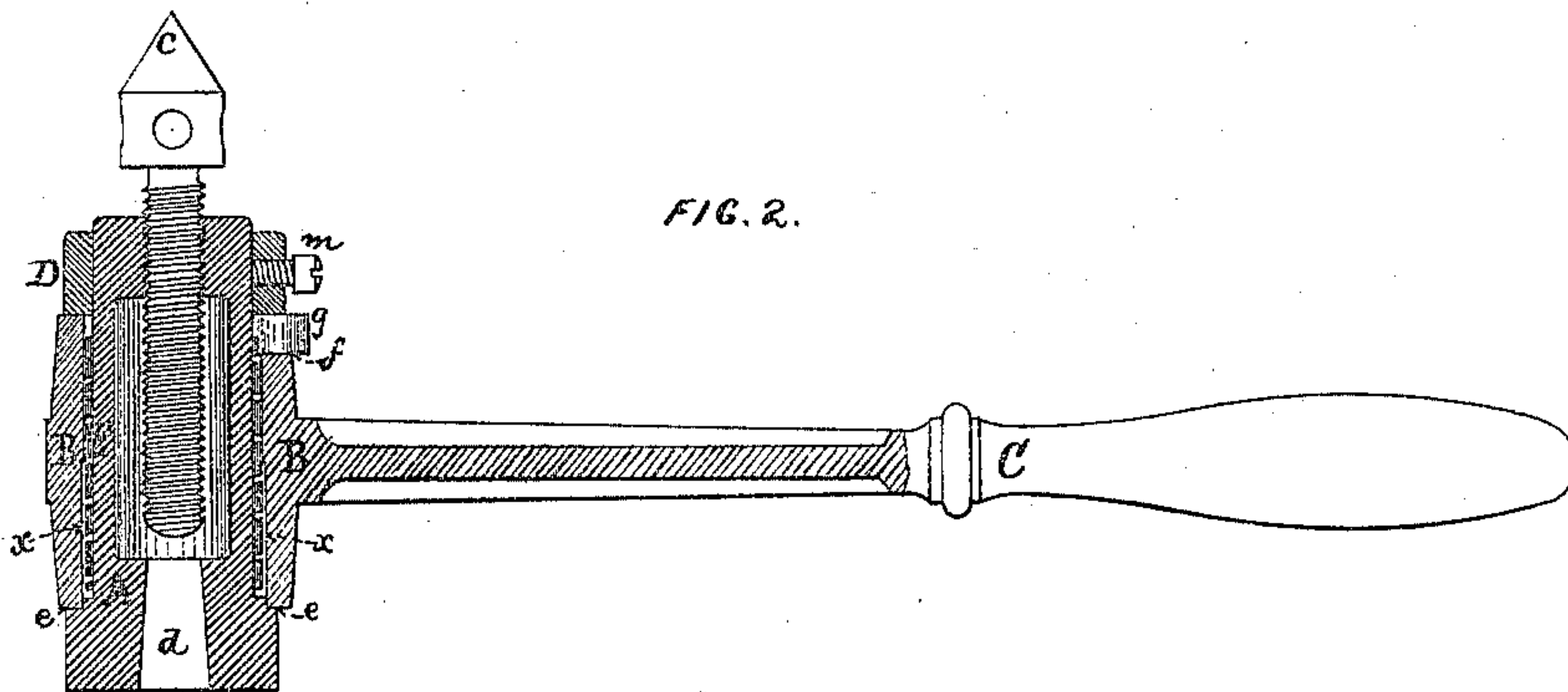
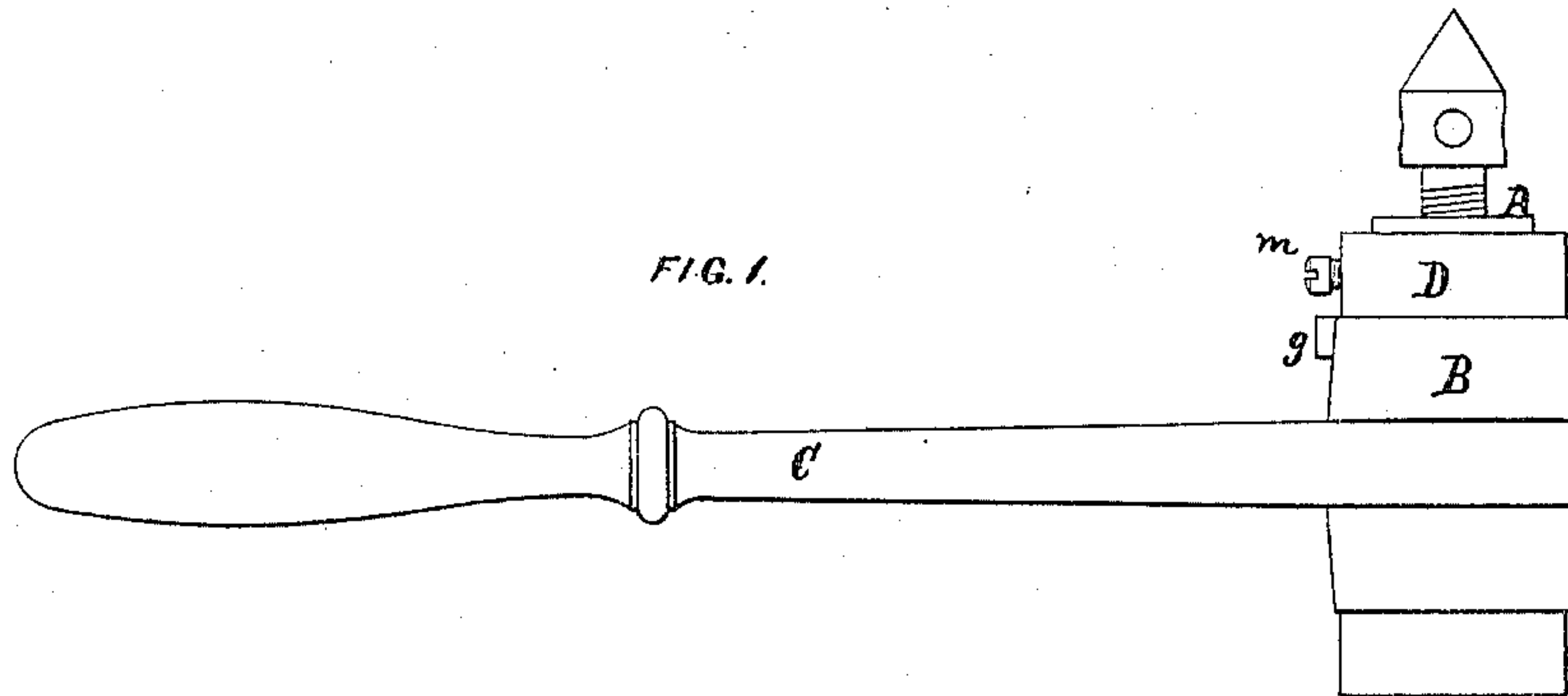


FIG. 3.



WITNESSES.

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## IMPROVEMENT IN DRILLS FOR DRILLING METALS.

Specification forming part of Letters Patent No. 134,355, dated December 31, 1872.

*To all whom it may concern:*

Be it known that I, WILLIAM C. BURCH, of Gloucester, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Hand-Drills; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing which forms part of this specification.

This invention relates to improvements in hand-drills of the character shown and described in United States Letters Patent granted to me on the 26th day of May, 1868, No. 78,183. In the said patented device the drill-shaft passes through a tubular head, which carries the operating lever or handle, and the bore through this head is of the same diameter throughout; and within this bore a helical spring is placed, which spring is caused to surround the drill-shaft, and is secured at one end to the tubular head by a pin or screw. On moving the handle in one, a forward, direction, the spring is caused to tightly embrace the drill-shaft and turn it; but on reversing the motion, or moving the handle backward, the spring ceases to bind upon or embrace the drill-shaft, and hence the drill and its shaft remain stationary while the head is moved around so as to take another forward or drill-propelling motion, such motion being common in ratchet-drills.

In practice I find that the spring, by reason of its being fastened by a pin or screw, is liable to become detached; the screw or pin often wears loose, or breaks off, or drops out, and such contingency usually necessitates the taking apart of the device to repair the difficulty, and oftentimes occasions much embarrassment and trouble; and further than this, I have found that the lever or loose end or part of the helical spring does not free itself quickly enough from the drill-shaft, and hence, oftentimes, the drill is turned backward a short distance on the backward throw of the handle—an action commonly called “backlash.”

The object of the present invention is to remedy these difficulties; and it consists, first, in securing the helical spring to the tubular head by means of a head formed on the end of the spring, and a slot or recess formed in the wall of the lever-head, the said spring-head being caused to enter the said slot or recess, where-

by a reliable and durable connection of the helical spring to the tubular head is insured; second, in making the bore of the lever-head larger at the part which encompasses the loose end of the spring than that which encompasses the fast end of the spring, thereby allowing the loose end of the spring a better chance to instantly release its hold upon the drill-shaft so soon as a backward throw of the handle commences.

In the accompanying drawing, Figure 1 is a side elevation of the hand-drill containing my present improvements; Fig. 2 is a central vertical section of the same; and Fig. 3 is a side elevation of the helical spring.

A designates the drill-shaft, the lower end of which is provided with a proper-shaped socket, *d*, for receiving the shank-end of the drill, and the upper end is provided with a screw-socket for receiving the end of a feeding-screw, *a*, the projecting or upper end of which is preferably provided with a conical point, *c*, designed to bear against any suitable stationary object, so that the feeding may be effected by turning a lever inserted into holes in or through the upper end of said feeding-screw *a*, as will be understood by reference to the drawing. B is the tubular head, provided with an operating handle or lever, C. The said drill-shaft A passes axially through the bore of said tubular drill-head, and the distance which it is to be inserted may be controlled by a shoulder, *e*, formed on its lower end. A ring or collar, D, may be caused to encompass the upper end of the said shaft and be held securely in position by a set-screw, *m*, passing through it and bearing against the drill-shaft. Within the bore of the head B a helical spring, E, is placed, and its upper end is secured to the said head B; and through this helical spring the drill-shaft to be operated by it passes.

The above parts are all found in the patent granted to me on the 26th May, 1868, before referred to; and the present improvements relate, as before stated, to the manner of attaching the helical spring to the drill-head, and to the construction of the bore through the drill-head.

A recess or slot, *f*, is cut in or through the wall of the head B, preferably through the head for a suitable distance down from the



upper end thereof, and the helical spring E is provided with a head or enlarged end, *g*, which, when the spring is slipped in the slot edge-wise, beyond the head, will cause the head to lie outside of the slot, and therefore hold one end of the spring securely to the head B.

I have shown this head *g* as formed by doubling over the end of the spring; but it is obvious that the plain end of the spring may be drawn through the slot, and a pin or screw inserted through a hole in such end, and thereby prevent the end slipping through; or, indeed, the end of the spring may be bent over at right angles, and, if necessary, riveted or otherwise fastened to the outside of the head B. And I will also remark that the slot need not be made entirely through the head; a recess may be made in the head—say a dove-tailed recess—in which case a corresponding-shaped end on the spring, when slipped from the edge of the head down into this recess, would accomplish the desired object. This latter construction would leave the head B with an unpunctured circumference. It will therefore be seen that the distinction between the improvement just described and that shown in my patent before referred to is this: In the patent a screw passes through the head B and enters the spring E, which screw, by reason of the continual torsion, or twisting and untwisting of the spring, when the drill is in use, oftentimes becomes loose and drops out, sometimes breaks off flush with the outside of the spring, sometimes breaks off in the head, and sometimes elsewhere, and it becomes necessary to take the device apart and refit the damaged parts, occasioning much delay and embarrassment. In the present improvement a far more durable and stronger fastening is produced, and one which, should it break, requires merely the insertion of a new spring to remedy all the difficulty. This im-

provement, therefore, contemplates the forming of a slot or recess through the head B, and so constructing one end of the spring with a head, or an equivalent therefor, which, in connection with such slot or recess, forms a simple, reliable, and durable fastening.

In my patented drill, before referred to, the bore through the head B is of the same diameter throughout. In practice, I have found that the loose end of the spring does not let up quick enough on the backward throw of the handle C, to prevent "backlash," as it is called, when the drill is carried around, upon moving the handle back to begin a propelling or forward throw. After considerable experiment, I have found that I can remedy this difficulty by increasing the diameter of the bore where the loose end of the spring lies within it—say about one-half of the length of the bore occupied by the spring. A greater or less distance of increased diameter will answer—but I prefer the construction shown in Fig. 2 of the drawing, where the increased diameter is designated by the letter *x*. I have also found in practice that this construction insures a quicker grasping or embracing of the drill-shank by the helical spring on starting the handle on the propelling throw.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the head *g* on the helical spring with the slot *f* in the wall of the lever-head, substantially as and for the purposes herein specified.

2. The lever-head, when provided with an enlarged bore at the part which encompasses the loose end of the helical spring, substantially as and for the purposes herein specified.

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Witnesses:

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