

(No Model.)

E. D. IVES.
Axle Arm for Vehicles.

No. 233,932.

Patented Nov. 2, 1880.

Fig. 1.

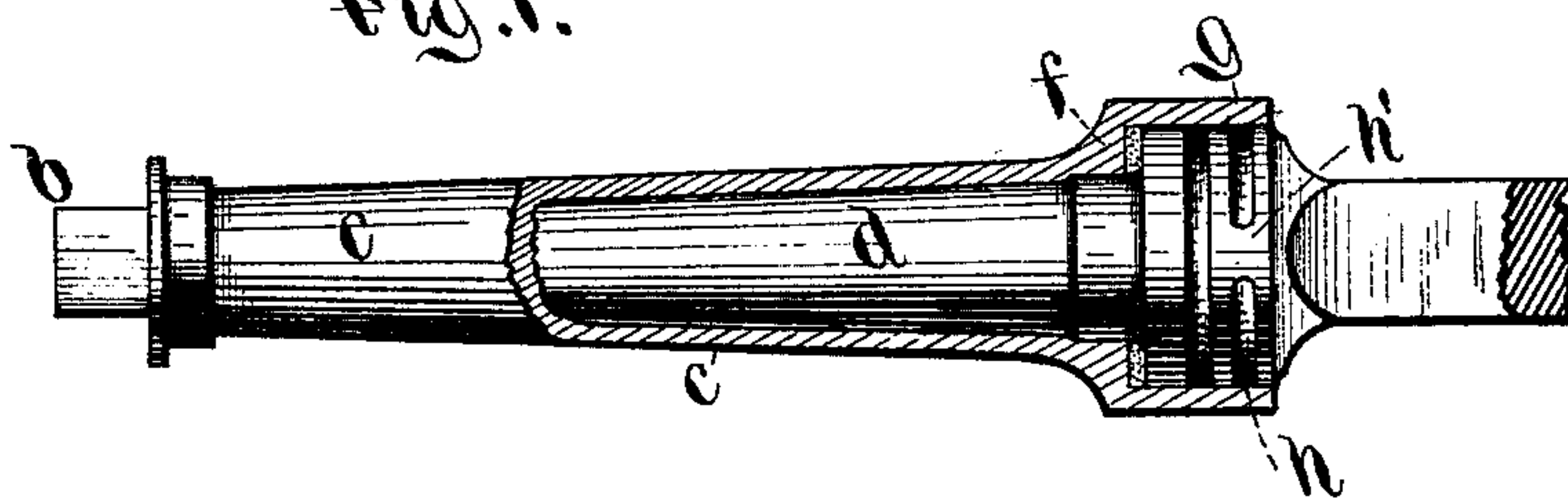


Fig. 2.

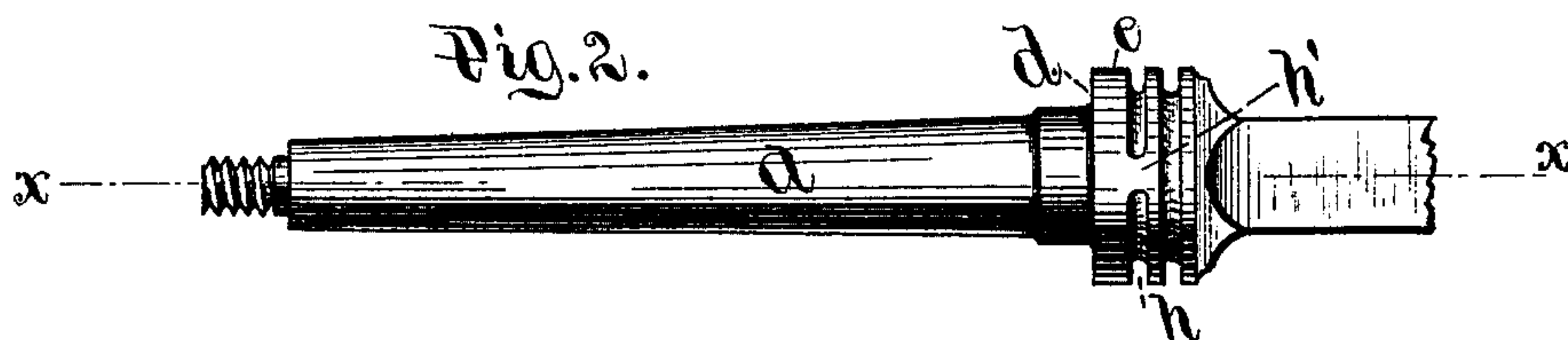
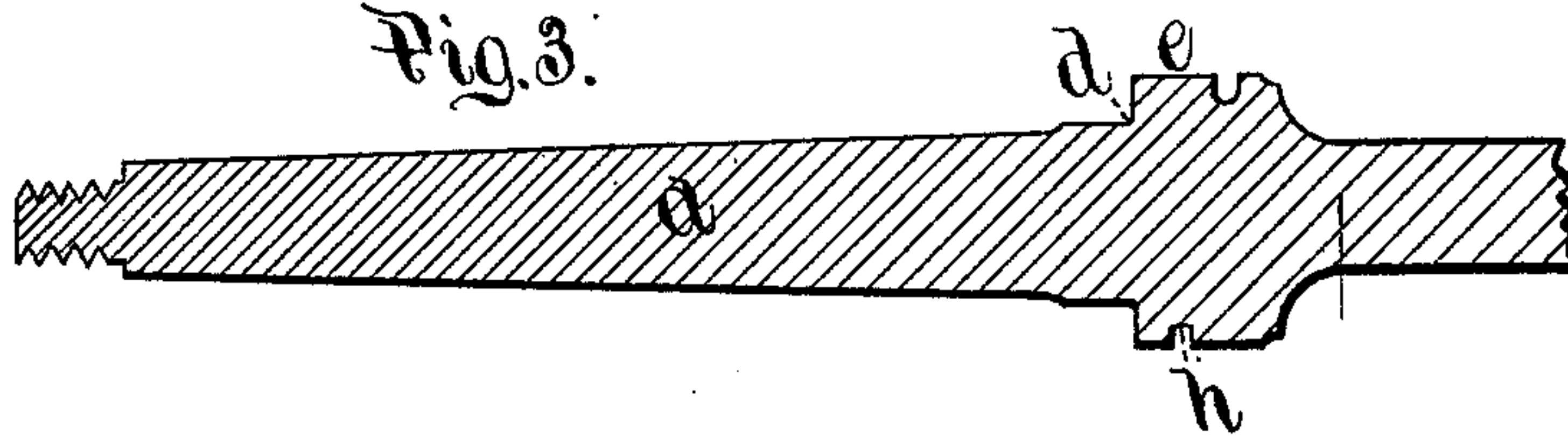


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

ELLSWORTH D. IVES, OF NORFOLK, CONNECTICUT.

AXLE-ARM FOR VEHICLES.

SPECIFICATION forming part of Letters Patent No. 233,932, dated November 2, 1880.

Application filed July 27, 1880. (No model.)

To all whom it may concern:

Be it known that I, ELLSWORTH D. IVES, of Norfolk, in the county of Litchfield and State of Connecticut, have invented a certain
5 new and useful Improvement in Axle-Arms for Vehicles, of which the following is a description, reference being had to the accompanying drawings, where—

Figure 1 is a side view of an axle-arm embodying my said improvement, with the box thereon represented as cut in vertical central longitudinal section. Fig. 2 is a side view of the axle-arm, only rotated just one-half an entire revolution from the position shown in Fig.
10 1. Fig. 3 is a view of the axle-arm shown in Fig. 2, cut in central longitudinal section on plane *x x*.
15

Perhaps the most serious difficulty there is to contend with in keeping the box and axle-arm intact on their contact-surfaces is the prevention of the access of dirt and sand to the interior of the box at the inner and larger end of the box. This point is constantly exposed to dirt and fine sand, and if it finds access to
20 the wearing-surfaces it is sure to cut away those surfaces rapidly, with the result of making the box loose on the axle.

It has been found that an annular groove at the wrist or shoulder of the axle covered
30 by the box is a very efficacious device for preventing the passage of dust and fine sand, and I have found that a plural number of such annular grooves, arranged side by side, is an almost perfect barrier; but as ordinarily constructed there is a grave objection to even a
35 single groove. The size of the axle at this wrist-point in diameter is practically limited by the fact that unless made small there results a cumbersome and unsightly hub, and
40 an equally cumbersome and unsightly lump on the axle, and yet this is the very point or

place where the axle is most likely to spring—*i. e.*, bend—so that even a single annular groove there located greatly increases the liability of the axle to spring.

The object of my improvement is to permit the use of a plural number of annular grooves at this point without increasing the diameter of the axle above the common diameter, and yet not increase the liability of the axle to
45 spring at this point.

The letter *a* denotes the axle-arm; *b*, the nut which secures the box upon the arm; *c*, the box.

The letter *d* denotes a shoulder at the rear
55 end of the axle-arm, and *e* denotes the wrist, by which is meant a round-surface back of said shoulder.

The box *c* has a shoulder, *f*, corresponding to shoulder *d*, and a cup, *g*, fitting to and covering the wrist *e*. In the surface of this wrist
60 are made two or more annular grooves, *h*, arranged side by side and covered by the cup *g*. These grooves are not completely annular. They are made by a milling-tool, and a bridge, *h'*,
65 *h'*, is left in each, and they are alternately on opposite sides of the axle from each other, a construction which leaves the wrist with almost, if not quite, the same strength against any springing strain, as if no annular grooves
70 had been made in it.

I claim as my improvement—

In combination, the box *c*, provided with cup *g*, the axle-arm *a*, the wrist *e*, and the annular grooves *h h*, provided with bridges *h' h'*,
75 located on opposite sides of the axle, all substantially as described, and for the purpose set forth.

ELLSWORTH D. IVES.

Witnesses:

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