(No Model.) 2 Sheets—Sheet 1.

F. H. RICHARDS.

SLIDE FEED MECHANISM.

No. 480,347. Patented Aug. 9, 1892.

Fig. 1

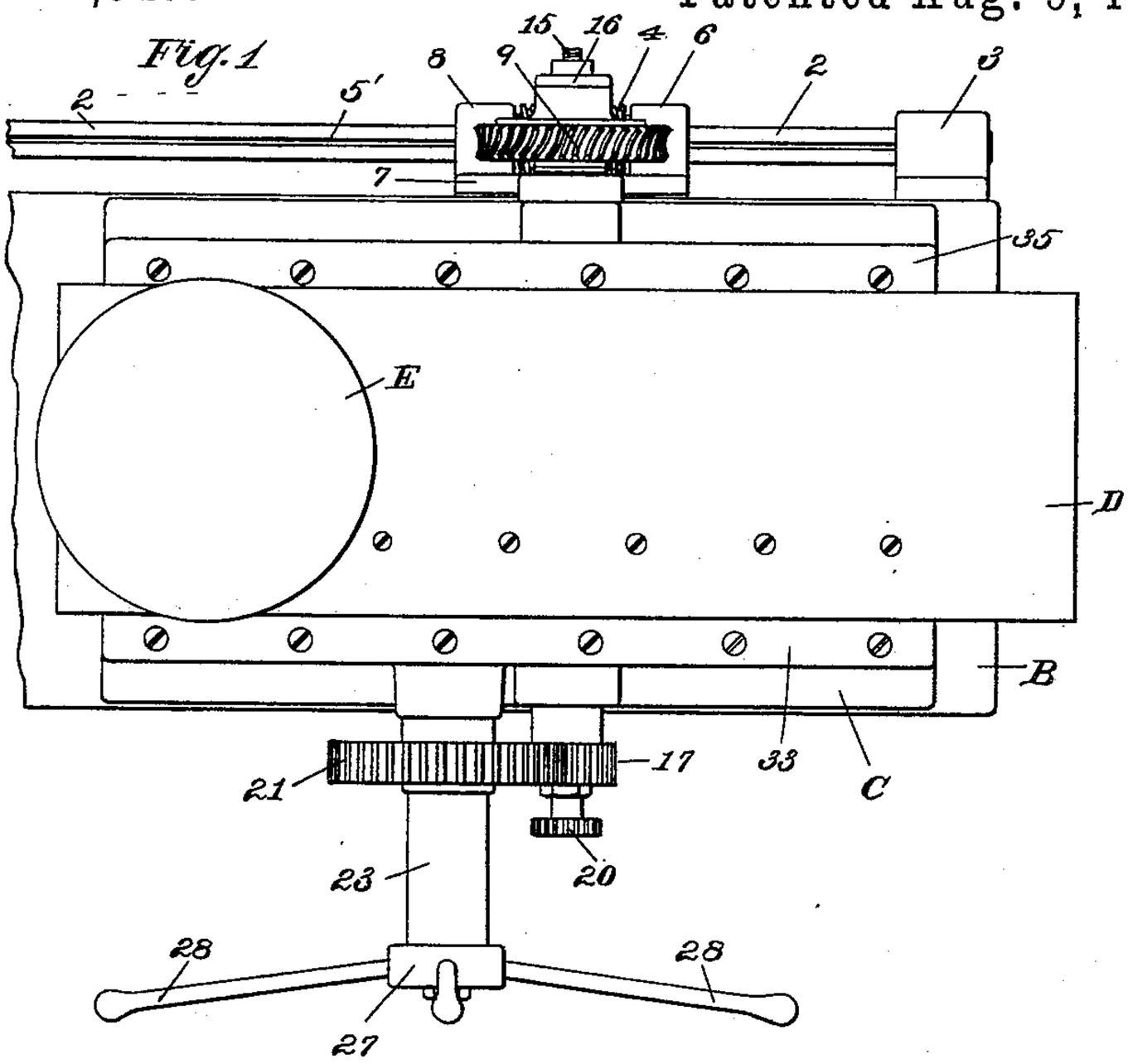
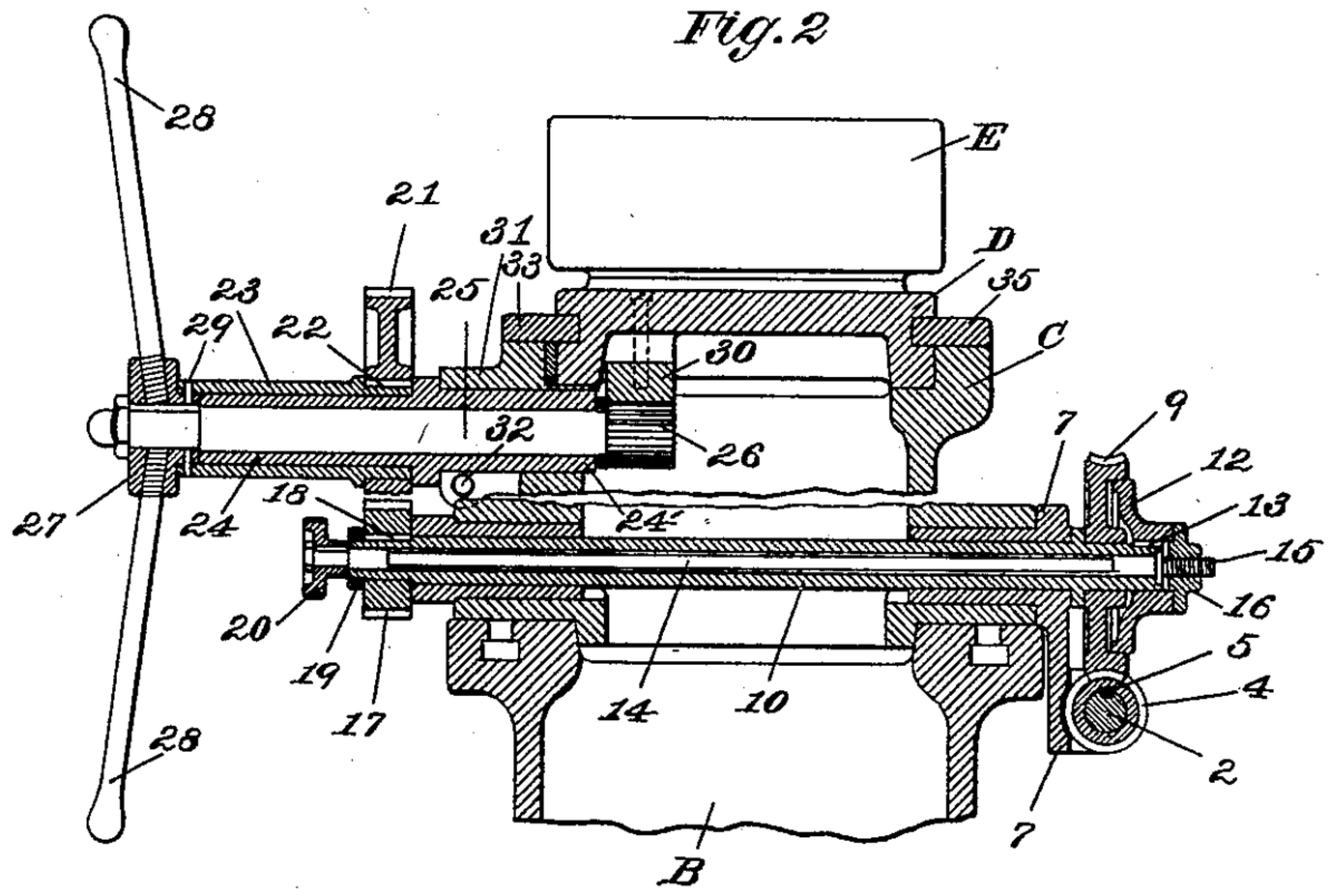


Fig. 2



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Henry L. Ruckard.

Inventor:
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(No Model.) 2 Sheets—Sheet 2.

F. H. RICHARDS.

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Fig. 3

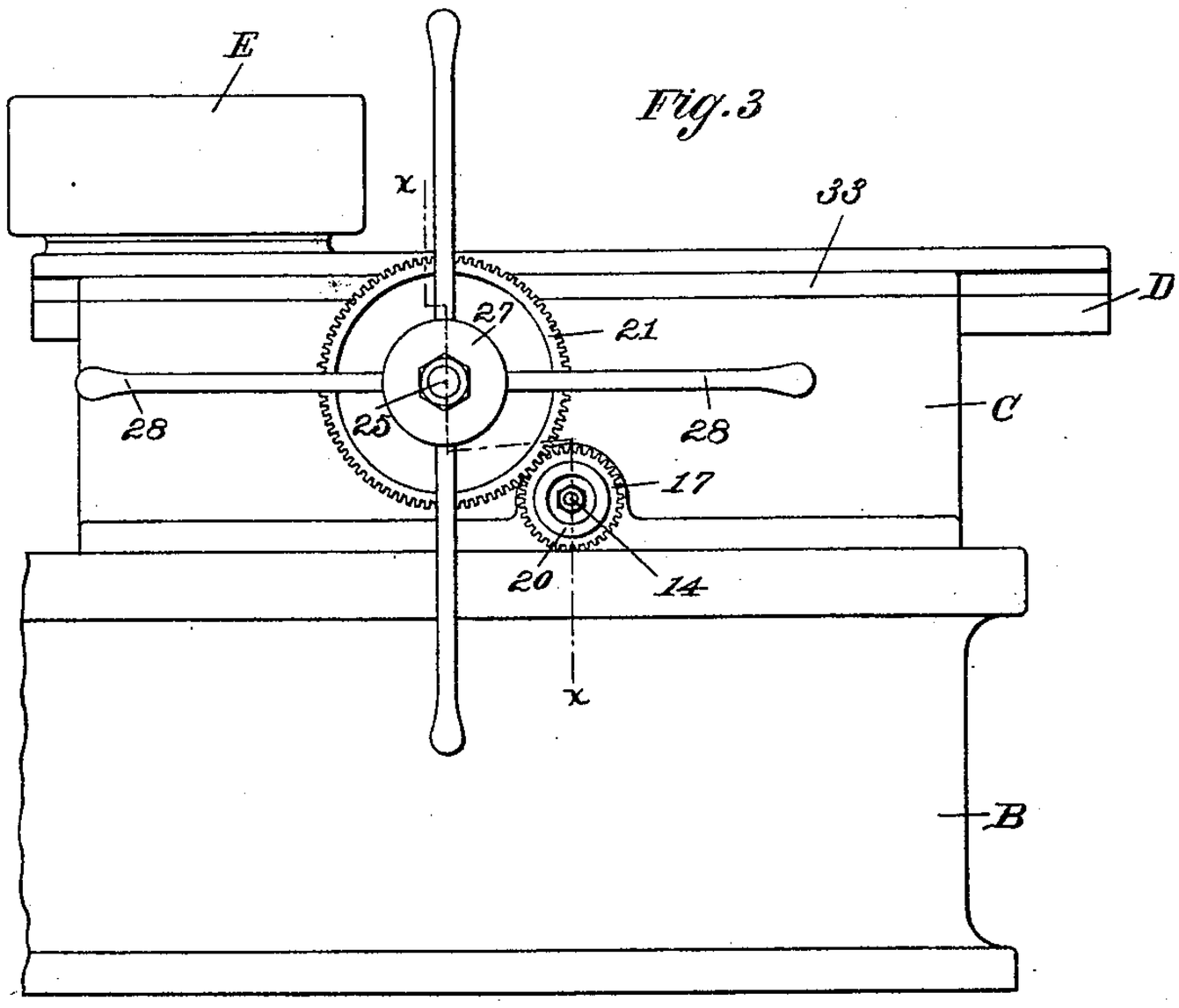
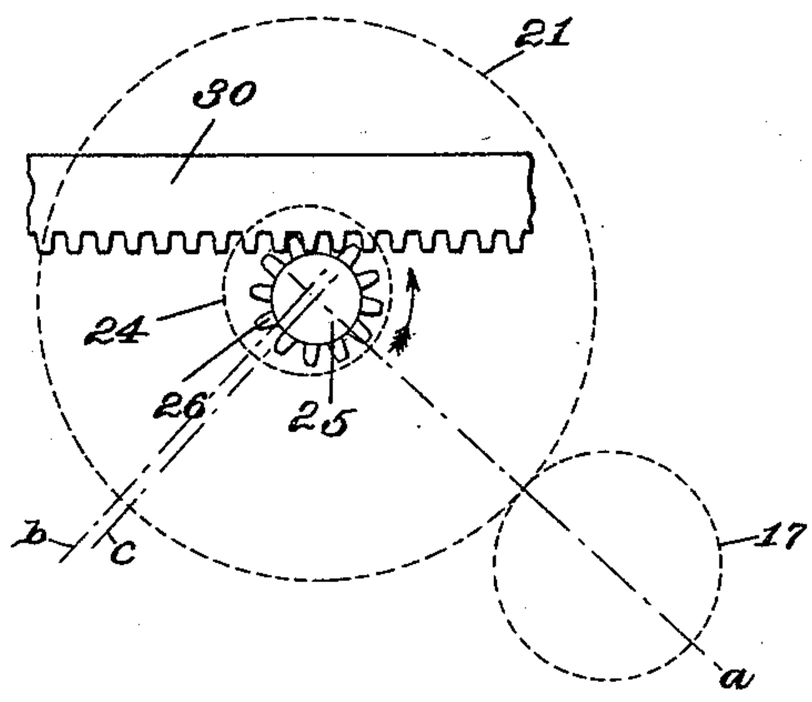


Fig. 4



Witnesses:
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UNITED STATES PATENT OFFICE.

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SLIDE FEED MECHANISM.

SPECIFICATION forming part of Letters Patent No. 480,347, dated August 9, 1892.

Application filed November 23, 1891. Serial No. 412,870. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Slide Feed Mechanism, of which the following is a specification.

This invention relates to feed mechanisms for the tool-carrying slides of machines, the object being to provide improved apparatus for feeding forward by power the turret-slide of a turret-lathe and for quickly advancing or retracting the same by hand.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view of a portion of a turret-lathe furnished with my present improvements. Fig. 2 is a vertical cross-sectional view in line *x x*, Fig. 3, of the parts shown in Fig. 1. Fig. 3 is a front elevation of the parts shown in Fig. 1. Fig. 4 is a diagrammatic view illustrating certain features of my invention.

Similar characters designate like parts in all the figures.

In the drawings only so much of a turret-lathe is shown as is necessary for the proper illustration of my present invention. The usual bed of the lathe is designated by B, and the slide-block C is shown set on said bed and carrying the operative parts of the feed mechanism. The turret-slide D is fitted for sliding movement on said block C and carries the usual turret E. The slide D is shown held in place by the usual straps 33 and 35.

The necessary power for actuating the feed mechanism is supplied by the usual splined shaft 2, which may be driven from the lathe-spindle (not shown) by gearing or by pulleys and a belt in a well-known manner. At the right-hand end thereof said shaft 2 is carried by a bearing 3, fixed to the bed of the machine, and at the left-hand end thereof should be similarly supported. The feed-worm 4 is fitted to slide on the feed-shaft 2 and has a key 5 fitting in the spline 5′ of said shaft. Said worm 4 is carried by bearings 6 and 8, which are fixed on the bearing-plate 7, that is fixed to the back side of the slide-block C and forms the bearing for carrying the rearward end of the intermediate or worm-wheel shaft 10. Said worm 4 meshes with a worm-wheel 9, which is fitted to freely turn on the hollow shaft 10, that is carried by suitable bearings in the slide-block C, as shown best in Fig. 2. The worm-wheel 9 is also a friction-wheel, it being fitted to engage the friction-disk 12, which is fitted for sliding movement on the outer or rearward end of the hollow shaft 10, being splined to said shaft by a key 13 in a well-known manner, so that when the disk 12 is revolved the shaft 10 revolves with it. A clutch-actuating rod 14 is carried within the hollow shaft 10 and is threaded at its rearward end 15 to engage the nut 16, that is rigidly fixed to the disk 12. At the front end thereof the shaft or rod 14 is furnished with a suitable handle, as the hand-wheel 20, for turning the rod to slide said disk 12 on the shaft 10 from or into engagement with the friction-wheel 9. On its forward end the shaft 10 carries a gear or pinion 17, usually fixed thereto by a key 18 and nut 19, from which to drive the slide-actuating shaft 25 of the feed mechanism. Said shaft 25 is carried by a sleeve 24, whose inner end 24′ is formed eccentric to the shaft-bearing or bore thereof. The sleeve is adjustably fixed by said eccentric end in the front side of the slide-block C, being clamped in proper circumferential position by the clamp-screw 32. The feed-shaft 25 has formed on or fixed to one end thereof the feed-pinion 26, whose teeth mesh with a rack 30, which is fixed to the under side of the slide D, whereby said slide may be advanced or retracted on rotating the shaft 25. The other end of the shaft 25 has fixed thereon a hub 27, provided with a series of spokes or lever-arms 28, by means of which the pinion 26 may be rotated by hand to quickly advance or retract the slide. The pinion 17 on shaft 10 meshes with and drives a larger gear 21, which is fitted by a key 22 to a sleeve 23, that is fitted to turn freely on the projecting concentric end of said sleeve 24 and is rigidly connected by pins 29 or otherwise to the hub 27, and thus with the shaft 25. By this or like means the gear 21 is firmly supported independently of the shaft 25 and yet is brought into a rigid rotative connection therewith.

Since the teeth of the pinion 26 and of the rack 30 should in practice fit together without any backlash, therefore I make the sleeve

24 for a portion of its length eccentric to the bore thereof and support said portion in the clamp-bearing 31, that is formed on the slide-block C. Said bearing is split on one side thereof and is furnished with a clamp-screw 32 for securely clamping said sleeve in said bearing. When by reason of wear there shall be any play or backlash between the teeth of the pinion 26 and the teeth of the rack 30, then by loosening the screw 32 and turning the sleeve 24 slightly in the bearing 31 the said teeth of the pinion and rack may be brought to a close fit. The diagrammatic view, Fig. 4, illustrates this feature of the mechanism, the gears 17 and 21, and also the periphery of the eccentric sleeve 24, being shown by dotted lines. The axis of the sleeve 24 being at the intersection of the lines *a* and *b* and the axis of the shaft 25 being at the intersection of lines *a* and *c*, it is evident that a slight rotation of the sleeve 24 in the direction of the arrow, Fig. 4, will carry the pinion 26 toward the rack 30 without materially affecting the meshing of said gears 17 and 21, all of said axes being normally and substantially on the line *a*. The movement of the shaft-axis, being directly crosswise to said line *a*, is neutral, within the limits of the required movement, to the gear 17.

The operation of the feed mechanism is as follows: To quickly advance or retract the slide, the friction-clutch being disengaged, the operator seizes the levers 28 and thereby turns the shaft 25 and its pinion to move the slide in one or the other direction, as may be required. Having set the slide in proper position for beginning the feed movement thereof, the operator seizes the hand-wheel 20 and turns the shaft 14 to engage the friction-clutch and thereby sets in operation the shafts and gearing of the automatic feed mechanism.

Having thus described my invention, I claim—

1. In a feed mechanism of the class specified, the combination, with the slide having the rack thereon, of the eccentric sleeve, the shaft journaled in said sleeve and having a pinion engaging the slide-rack, means for revolving the shaft by hand, and means for holding the sleeve in place by the eccentric portion thereof, substantially as described, and for the purpose specified.

2. In a feed mechanism of the class specified, the combination, with the slide having the rack thereon, of the sleeve 24, formed eccentric at one end thereof and supported by its eccentric portion adjacent to the slide, the shaft journaled in said sleeve and having a pinion engaging the slide-rack, means for revolving said shaft by hand, and the sleeve 23, revolubly supported on the concentric portion of the sleeve 24 and connecting with said pinion-shaft, and means for revolving said sleeve 23 by power, substantially as described, and for the purpose specified.

3. In a feed mechanism of the class specified, the combination, with the bed of the machine, of the slide-block on said bed, the slide on said block and having a rack, the shaft 2, parallel with the line of movement of the slide-block, the intermediate shaft carried by the slide-block, feed-gearing intermediate to the shaft 2 and said intermediate shaft and provided with a clutch and means for engaging and disengaging the same, the sleeve carried in the block and carrying a shaft journaled therein and provided with a pinion engaging the slide-rack, and gearing actuating said pinion-shaft from the intermediate shaft, substantially as set forth.

4. In a feed mechanism of the class specified, the combination, with the slide-block having the clamp-bearing 31, of the slide supported on said block and having a rack thereon, the sleeve 24, having one end formed eccentrically to its bore and supported by said eccentric portion in said clamp-bearing, the shaft 25, journaled in said sleeve and having a pinion engaging the slide-rack, the gear 21, supported on the concentric projecting portion of the sleeve 24 and connected with the shaft within said sleeve, and the pinion 17, meshing with said gear 21 and set in the normal plane of the axes of said eccentric and said shaft 25, substantially as described, and for the purpose specified.

FRANCIS H. RICHARDS.

Witnesses:
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