

July 14, 1953

A. FRANCESCATTI ET AL
CHAIN-MORTIZING SQUARE HOLE CUTTING
ATTACHMENT FOR DRILL PRESSES

2,645,255

Filed Aug. 20, 1948

3 Sheets-Sheet 1

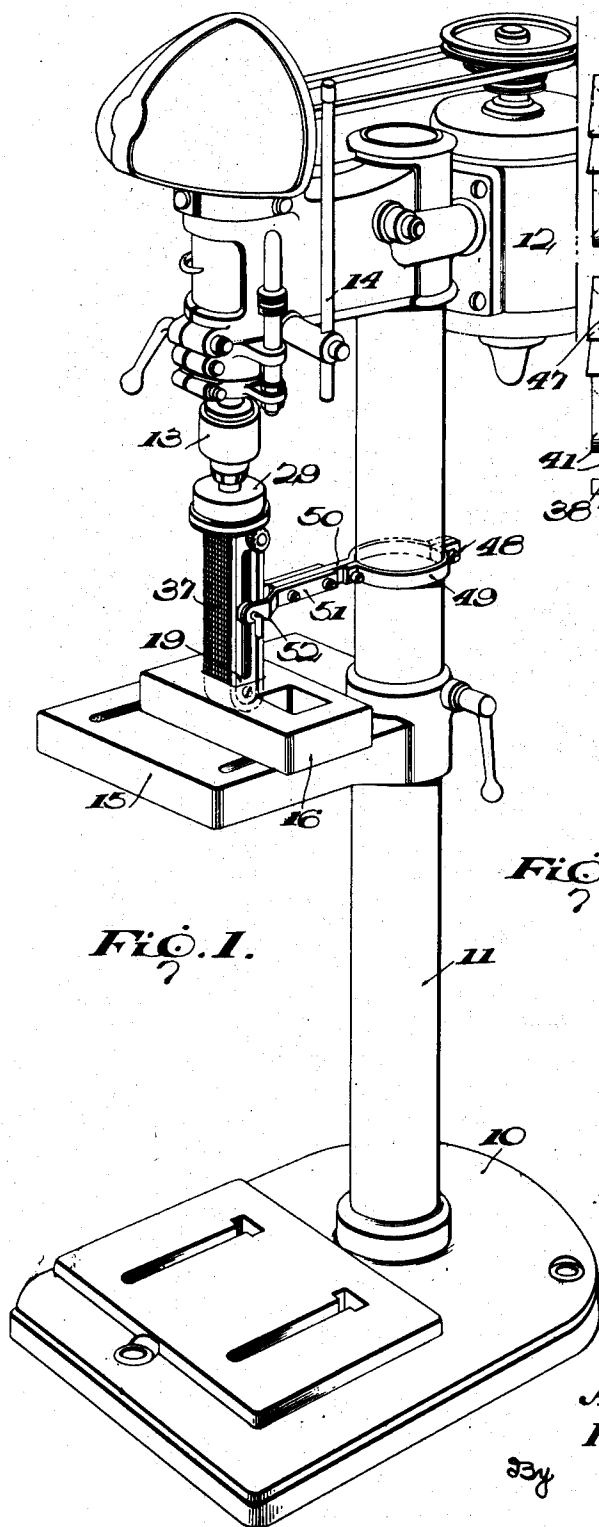


FIG. 1.

FIG. 2.

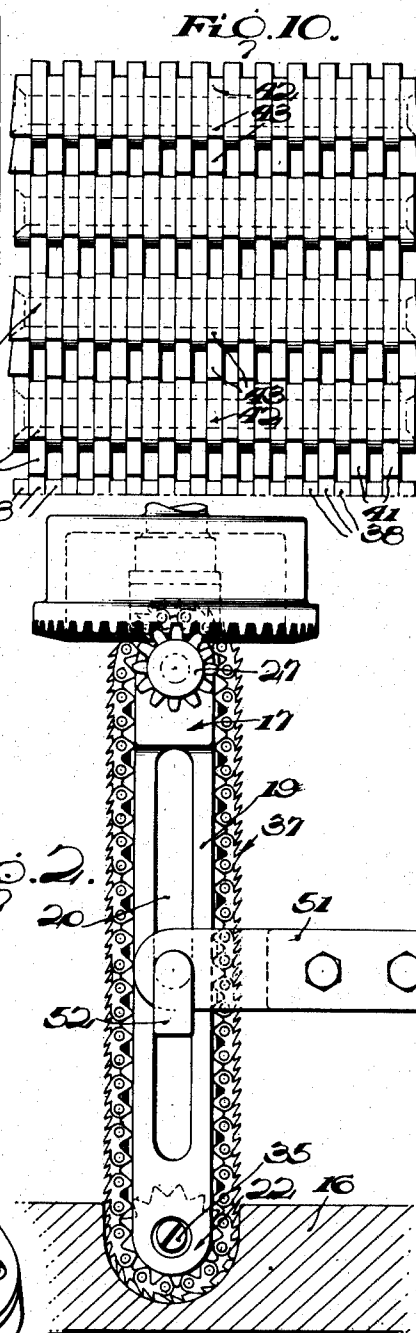


FIG. 10.

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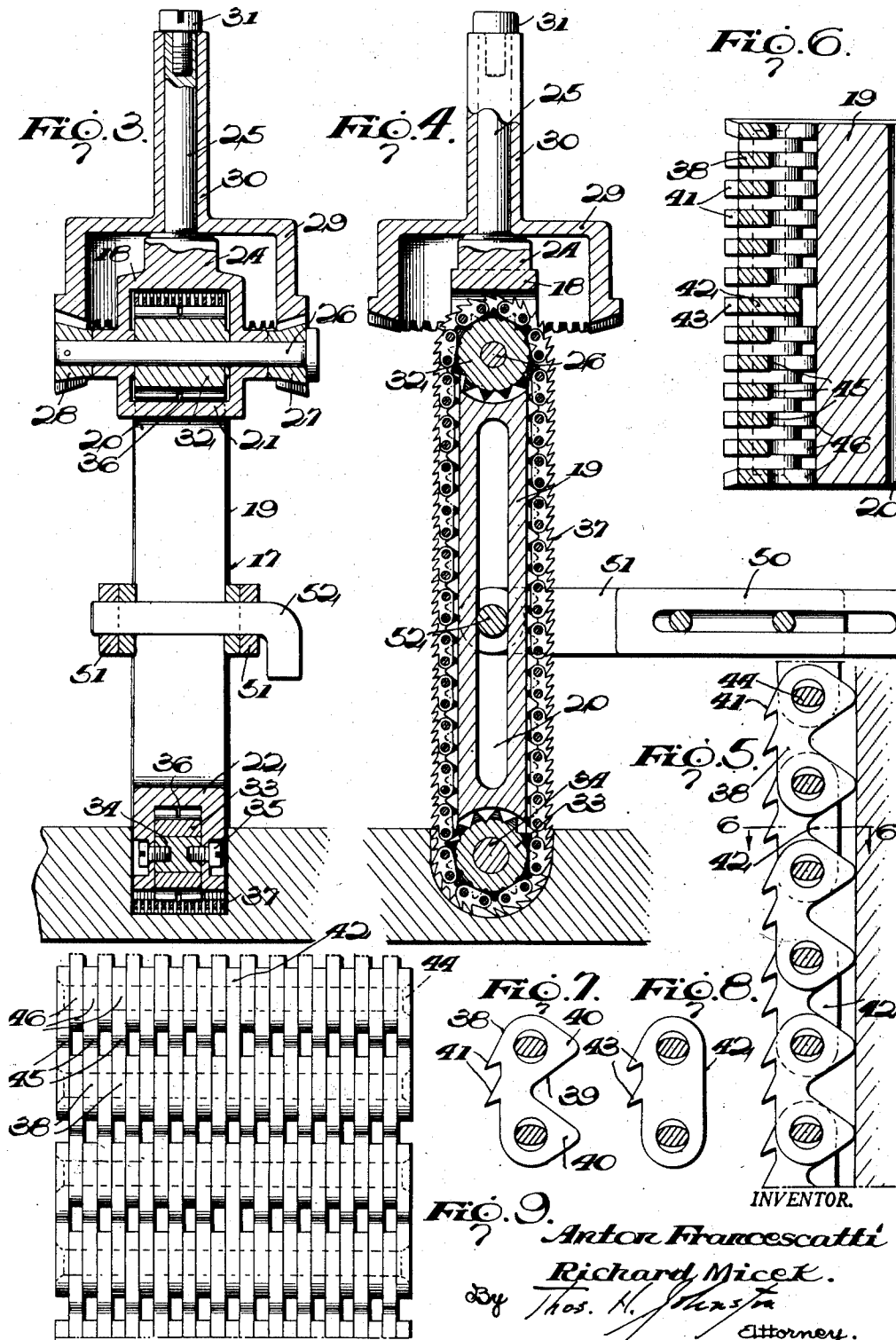
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FIG. 11.

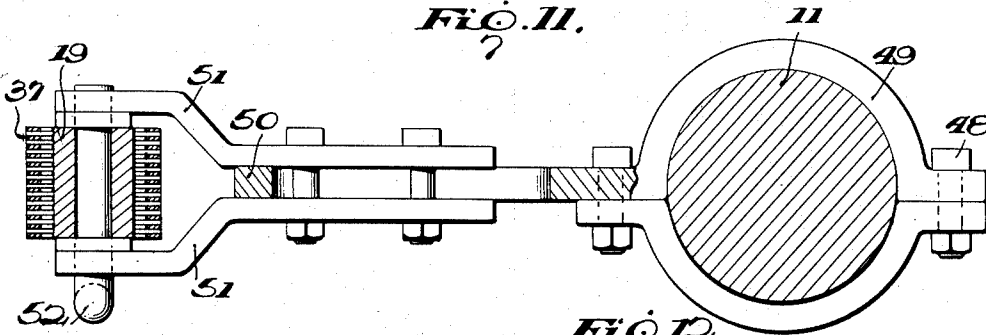


FIG. 12.

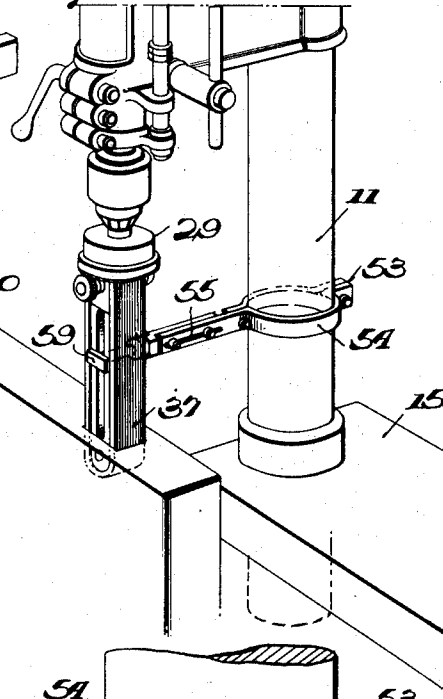


FIG. 14.

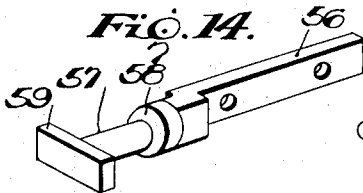
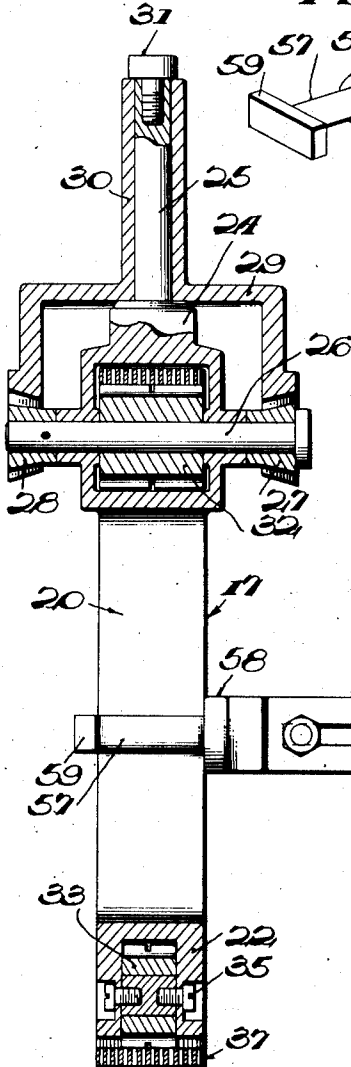


FIG. 13.

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CHAIN-MORTISING SQUARE HOLE CUTTING
ATTACHMENT FOR DRILL PRESSESAnton Francescatti and Richard Micek,
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1 Claim. (Cl. 144—72)

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This invention relates to an improved tool for cutting square holes or sockets, rectangular channels, mortises, grooves, or the like in either metal or wood.

The general demand almost throughout the machining industry for a simple and efficient tool, light in weight, which may be readily attached to present equipment to be driven thereby, or as easily detached, and used for cutting square holes, sockets, and the like is well recognized. Insofar as known, an individual heavy machine of one kind or another has alone been commercially offered for the purpose, but most if not quite all of such machines require several operations, such as milling and broaching, and sometimes others, such as grinding or honing, to accomplish the object sought.

An object of the present invention, therefore, is to provide a simple and efficient tool which may be readily attached to or detached from a conventional drill-press and operated for cutting square holes, sockets, or the like, in metal or wood at a single operation.

A further object of the invention is to provide a tool embodying a cutting chain which, when the tool is attached to the drill-press, will be driven by the drill-press, under the usual controls of the drill-press, to accomplish a desired cutting operation, and wherein the tool, as a whole, may be advanced or retracted by the drill-press in the customary manner, to cut into the work, or to lift therefrom.

And the invention seeks, as a still further object, to provide a tool which may be employed in connection with conventional drill-presses as now in general use.

Other and incidental objects of the invention will appear during the course of the following description, and in the drawings:

Figure 1 is a perspective view showing our improved cutting tool applied to a conventional drill-press.

Figure 2 is a fragmentary side elevation of the tool.

Figure 3 is a vertical section taken laterally from side to side through the tool.

Figure 4 is a vertical sectional view taken from front to rear through the device.

Figure 5 is an enlarged detail side elevation of a portion of the cutting chain.

Figure 6 is a section on the line 6—6 of Figure 5.

Figure 7 is a detail elevation of a typical cutting link of the cutting chain.

Figure 8 is a detail elevation of a typical combined guide and cutting link of the chain.

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Figure 9 is an enlarged fragmentary rear elevation of the cutting chain.

Figure 10 is a fragmentary enlarged front elevation of the cutting chain.

Figure 11 is a horizontal section particularly showing the guide bracket for the cutting tool.

Figure 12 is a fragmentary perspective view showing the use of a modified form of guide bracket.

Figure 13 is a view partly in section and partly in elevation and showing the modified form of guide bracket.

Figure 14 is a detail perspective view of the headpiece of the modified form of guide bracket.

Referring now more particularly to the drawings, we have shown a conventional drill-press embodying a base 10 from which rises a post 11. The motor of the drill-press is indicated at 12, and the usual chuck thereof at 13, said chuck being rotatable, as will be well understood, by the motor. The customary handle for raising or lowering the chuck, as will also be well understood, is indicated at 14. Adjustable vertically on the post 11 as well as rotatably adjustable thereon is the usual table 15. All of the foregoing structure and the operation thereof is well known in the art and requires no detailed description. In the present instance, we have shown a block of work 16 on the table 15.

In carrying the invention into effect, we employ an oblong frame 17 of more or less skeleton construction. This frame includes a box-like head 18 from which extends a stock 19 rectangular in cross section and having a longitudinal slot 20 therein. Closing the head 18 at its lower side is a web 21, and formed on the stock at its lower end is a yoke 22. Rising from the upper side of the head 18 is a bearing 24, and upstanding from said bearing is a stub shaft 25.

Journalled through the head 18 of the frame 17 is a drive shaft 26 on one end of which is mounted an idler gear 27, and pinned or otherwise fixed to the opposite end of said shaft is a gear 28. Resting upon the bearing 24 is a cupped drive gear 29 meshing at its lower periphery with the gears 27 and 28, and rising from the gear 29 is an axial stem 30 rotatably fitting the stub shaft 25 of the frame. Engaged with the upper end of said stub shaft is a cap screw 31 detachably securing the drive gear in position.

As will now be apparent from the foregoing, if the frame 17 is held against rotation, turning of the drive gear 29 will serve to rotate the shaft 26 through the medium of the gear 28. The idler gear 27 is provided to equalize the load as between the ends of said shaft.

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Fixed to the shaft 26 is a drive sprocket 32, and journaled in the yoke 22 is a coacting sprocket 33 mounted by a pin 34. Engaged through the side plates of the yoke to enter the ends of said pin are cap screws 35 detachably mounting the pin and sprocket. As will be observed, the sprockets 32 and 33 are provided with medial annular grooves 36.

Trained about the sprockets 32 and 33 is a cutting chain, indicated as a whole at 37. A typical individual cutting link 38 of the chain is shown in Figure 7. As will be noted, the link is formed at its rear edge with a notch 39 which defines lobes 40 at the ends of the link, and formed on the forward edge of the link, more or less near the heel portion thereof, are cutting teeth 41.

The cutting chain 37 further embodies a combined cutting and guide link 42, shown in detail in Figure 8 of the drawings. The link 42 is similar to the link 38 in that the link 42 is provided at its forward edge more or less near the heel portion thereof with cutting teeth 43. However, the link 42, instead of being provided at its rear edge with a notch, as the link 38, is formed with a straight rear edge. In other words, the link 42 is, over all, symmetrically oblong.

As seen in Figures 5 and 6 of the drawings, the links 38 and 42 are digitated to form the chain 37 and are connected at their meeting ends by transverse pivot pins 44 somewhat oval in cross section so that the chain may flex freely around the sprockets 32 and 33, one of which pins, of no particular interest, is endwise removable so that the chain may be readily assembled about the sprockets or removed therefrom.

Looking at the rear of the chain 37, as shown in Figure 9, it will be seen that the transverse aligned links 38 provide, through the medium of the notches 39, transverse grooves 45 to accommodate the teeth of the sprockets 32 and 33, and transverse rows of teeth 46, provided by the lobes 40, to coact with the teeth of the sprockets, so that as the sprocket 32 is rotated, the cutting chain will be driven to turn about both sprockets.

It is also envisioned to prevent sidewise slippage of the cutting chain 37, as this feature is important in order that the chain shall cut true. To this end, the combined cutting and guide links 42 are provided. As seen in Figure 9, these links of the chain are arranged in a series medially of the chain so that the straight rear edges thereof will be received in the grooves 36 of the sprockets 32 and 33, as the chain travels. Consequently, these links will coact with the sprockets to guide the chain in a straight path and prevent lateral displacement of the chain as it bites into the work.

Looking now at the front face of the cutting chain 37, as enlarged in Figure 10, it will be noted that, referring back to Figure 7, the uppermost of the aligned teeth 41 of a given transverse row of links form one transverse row of teeth, and the lowermost of said teeth form another transverse row of teeth, while below the lowermost row of teeth is provided a clearance space 47 next between repeating sequence of rows of teeth. It has been found in practice that the clearance space 47 is necessary as a channel to accommodate shavings, or as perhaps may be better said, grains, or small bits of cuttings. Otherwise, the chain tends to choke. For such reason, the teeth 41 or 43 are located near the heel of each link respectively.

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The stem 30 of the drive gear 29 is of a size to be removably accommodated in the usual chuck of a conventional drill-press, and, in Figure 1 of the drawings, we have shown the device so engaged with the chuck 13 of the drill-press typified. As will be appreciated, in view of the foregoing description, the chuck 13, when driven, will turn the stem 30, and so rotate the gear 29.

As previously noted, it is necessary to lock the frame 17 of the tool against rotation in order to effect rotation of the cutting chain 37. To this end, we provide a bracket, indicated as a whole at 38. This bracket includes, as best seen in Figure 11, a collar 49 detachably engaged about the post 11 of the drill-press for adjustment vertically of the post, and extending from one arcuate portion of the collar is an arm 50. Adjustable longitudinally of said arm are yoke plates 51 which straddle the frame 17, and extending through said plates and through the slot 20 of the stock of the frame is a removable locking pin 52. Thus, the bracket 48 will not only hold the frame 17 against turning movement but also, the pin 52 will guide the frame in its vertical movement as the tool is raised or lowered.

Assuming now that the tool is attached to a drill-press, as shown in Figure 1, it will be seen that the motor of the drill-press may be operated under the usual controls of the drill-press to drive the cutting chain 37, while the handle 14 of the drill-press may be manipulated to either raise the tool or lower the tool to engage the work 16 for cutting a square hole therein, or if desired, a square socket therein.

In Figures 12, 13, and 14 of the drawings, we have shown a modified form of bracket adapting the tool to cut channels or mortises in long pieces of work.

As seen in Figure 12, the table 15 of the drill-press is swung aside, and attached to the post 11 is a bracket 53 embodying an adjustable collar 54 from which extends an arm 55. Adjustable upon said arm is a head-piece 56, seen in detail in Figure 14 of the drawings. This head-piece includes a stem 57 which extends through the slot 20 of the stock 19 of the frame 17 of the tool, and is formed at the base of the stem with a collar 58, while at the outer end of the stem is provided a head 59. By aligning the head with the slot 20, the head may be freely inserted through said slot, after which the head is turned to horizontal position so that the frame will thus be confined between the head and collar and thus limited against lateral displacement.

It is now to be noted that in Figure 1 of the drawings, the cutting chain 37 is presented in what may be described as a forward and rear position with respect to the post 11 of the drill-press, whereas, in Figure 12, the cutting chain is presented laterally. A door, or other work, as conventionally shown at 60, may thus be disposed with one longitudinal edge up at one side of the table 15 for engagement by the tool, and moved longitudinally as the cutting operation progresses so that the chain 37 may cut a longitudinal slot as long as desired at a chosen point along the upper edge of the door.

Having thus described our invention, we claim:

A cutting tool of the character described including a frame having a stock provided with a head and formed with a longitudinal slot therein, a stub shaft rising from said head, a drive shaft journaled through said head and having a gear fixed thereon, a sprocket carried by the drive shaft, a second sprocket journaled upon

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the lower end of said stock, a cutting chain trained about said sprockets and having its reaches between the sprockets extending parallel to the side walls of said slot, a drive gear meshing with the former gear and having a tubular stem journaled upon said stub shaft, said drive gear being freely removable at the upper end of said stub shaft, fastening means engaging the upper end of the stub shaft and coacting with said stem to removably secure the drive gear in position, said stem with its fastening means being receivable in the vertically movable chuck of a drill-press for actuation of the stem thereby to rotate the drive gear and turn said chain about the sprockets, and means fixed to the drill-press for locking the frame against rotation and including an element extending

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through said slot of the stock and adapted to guide the frame vertically as said chuck is raised or lowered.

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