Nov. 26, 1935. J. FALLON 2,021,913

ROLLER FOR CONVEYER FURNACES

Filed Dec. 14, 1934 2 Sheets-Sheet 1

Fig. 1.

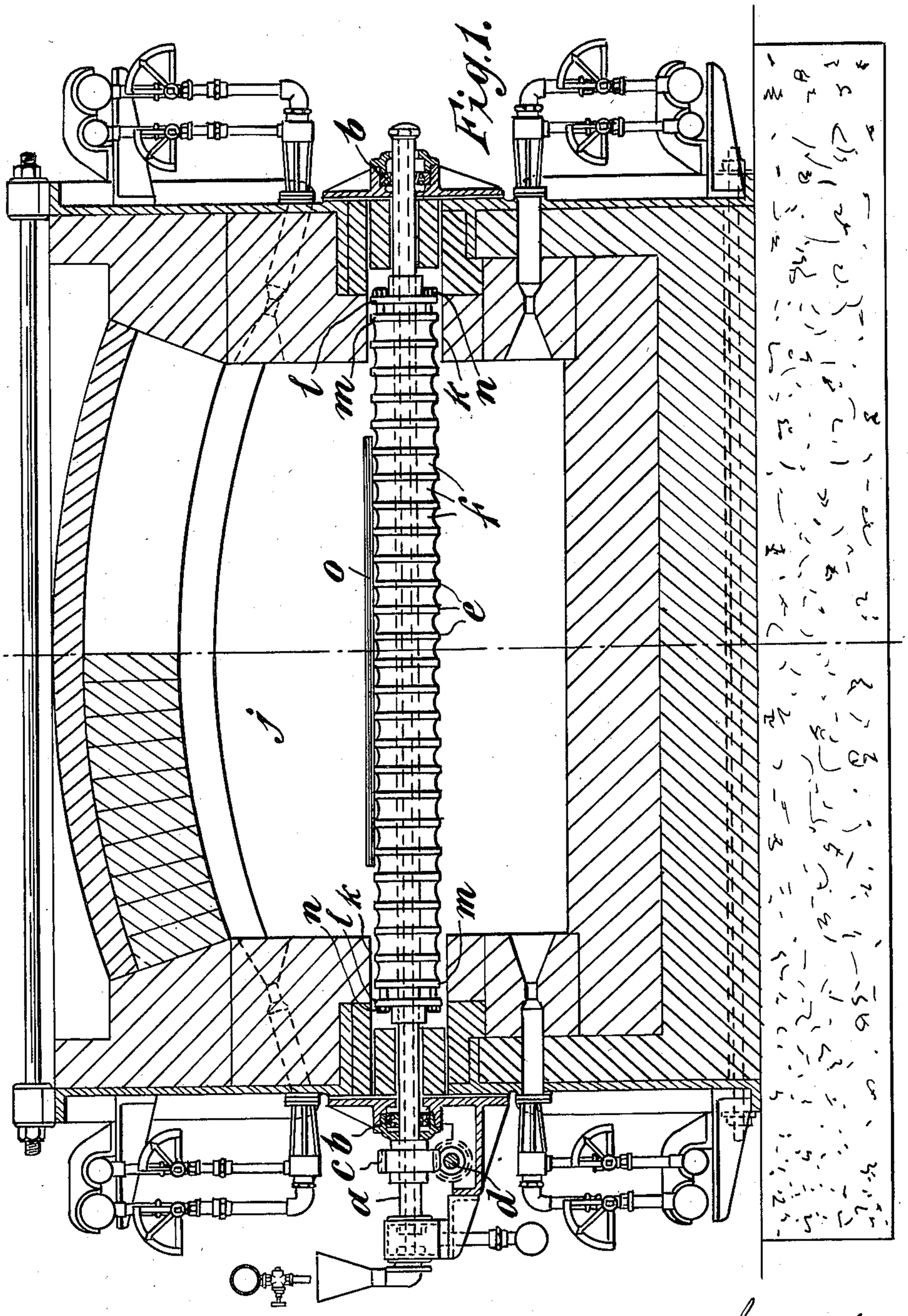

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Fig. 2.

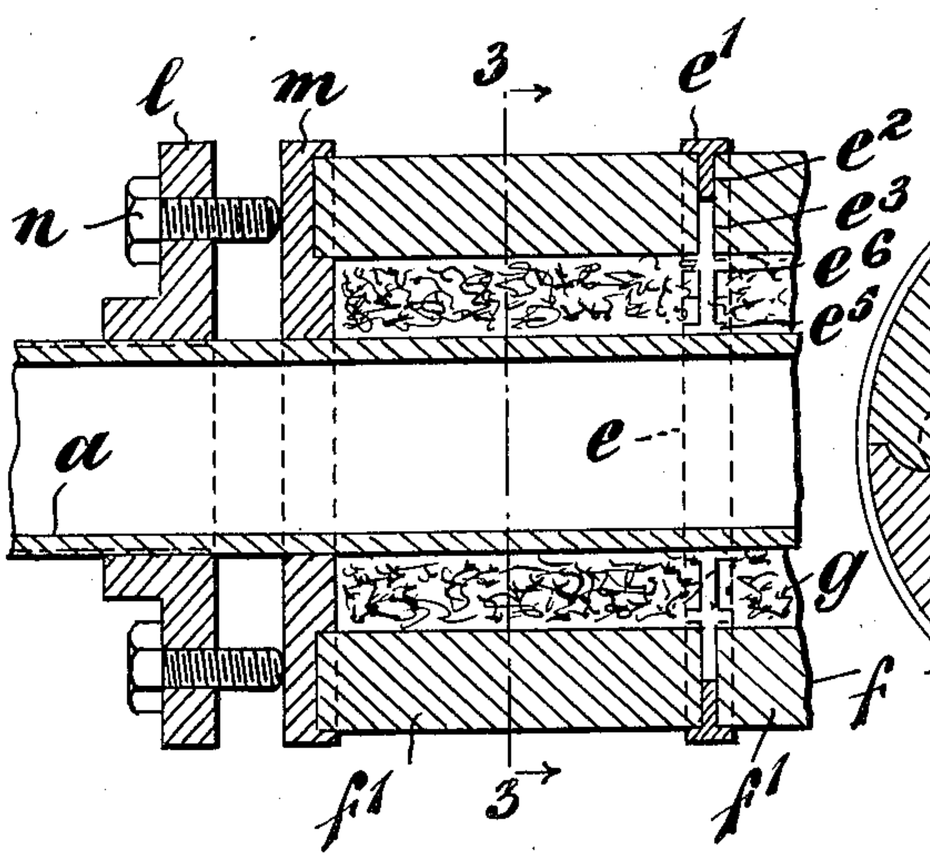


Fig. 3.

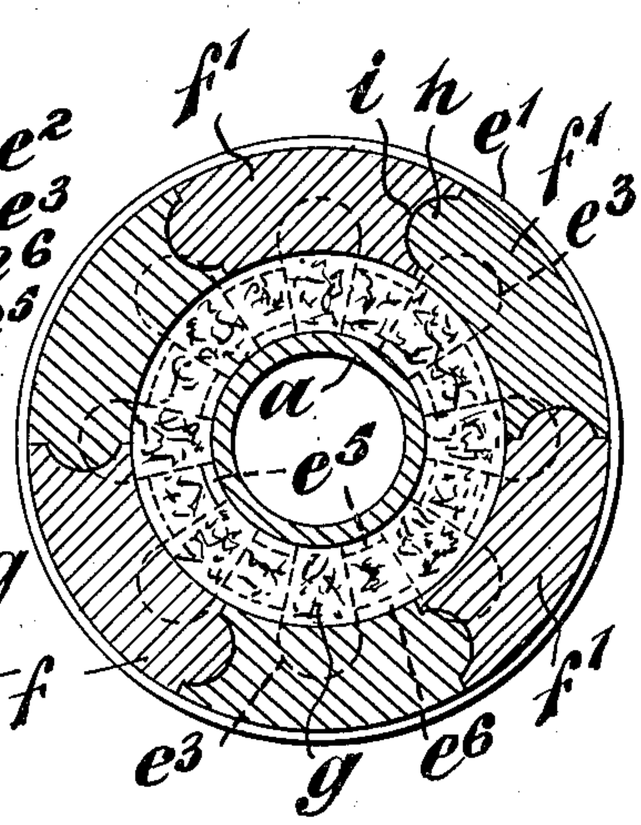


Fig. 5.

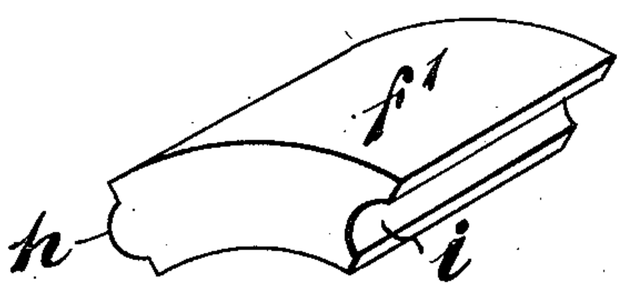
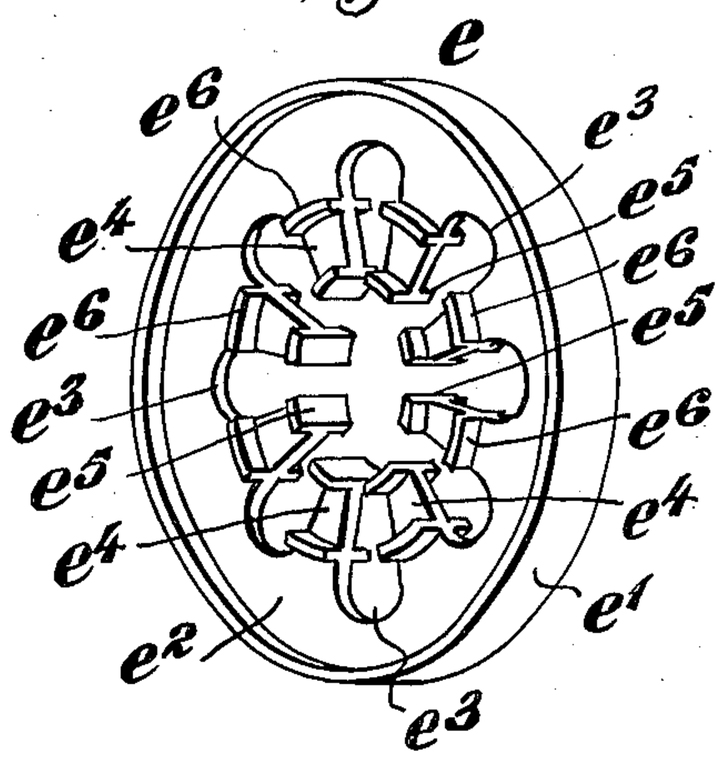


Fig. 4.



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UNITED STATES PATENT OFFICE

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ROLLER FOR CONVEYER FURNACES

John Fallon, Birmingham, England

Application December 14, 1934, Serial No. 757,419
In Great Britain December 15, 1933

3 Claims. (Cl. 263—6)

My invention has reference to improvements in connection with rollers for conveyer furnaces.

The present invention consists firstly in a roller for use in a conveyer furnace, which roller is of a composite construction comprising a series of metallic discs and a series of refractory insulating members assembled in alternated relation on a shaft, the shaft preferably being provided at one or at each end with a pressure device adapted to maintain the alternated series of discs and refractory members in position.

The invention further consists in a roller for use in a conveyer furnace, which roller is of a composite construction comprising a series of metallic spacing discs and a series of refractory insulating sections assembled in closely alternated relation on a tubular shaft, said sections being characterized by refractory outer tubes in combination with insulating tubular liners, and said shaft being fitted at one or at each end with a pressure device adapted to maintain the alternated series of discs and tubes in position; still further features of the invention being that the refractory outer tubes are of interlocking segmental block formation, and that the web of each metallic spacing disc is formed with inwardly open radial slots and intervening radial bearing fingers, and with lips disposed in concentric inner and outer annular series on opposite sides of said fingers for locating support of the insulating tubular liners and of the component segmental blocks of the refractory outer tubes.

In order that the invention may be clearly understood and readily carried into practice, reference may be had to the appended explanatory drawings, in which:—

Figure 1 is a sectional end elevation of a conveyer furnace of roller hearth type having the present improvements applied.

Figure 2 is a detail view of a composite roller shown in longitudinal section.

Figure 3 is a cross-sectional view taken on line 3—3 of Figure 2.

Figure 4 is a perspective view of one of the metallic spacing discs.

Figure 5 is a perspective view of one of the component segmental blocks of the refractory outer tube sections.

In a convenient method of carrying the invention into effect, as applied to a conveyer furnace of the roller hearth type having live rollers disposed transversely in parallelly spaced spaced relation from end to end of the furnace and having over and under firing, the rollers are of a composite disc and tube construction built up on air or water cooled tubular shafts *a* mounted in external ball-bearings *b*, the entire set of rollers being externally geared for rotation at conveying speeds by means of worm wheels *c* on the respective shafts in conjunction with a longitudinal worm shaft *d* driven by a variable speed motor. In the construction of the rollers a spaced series of discs *e*, formed from heat-resisting metal or metallic alloy, is mounted upon each of the tubular shafts *a*, each of these discs *e* having an integral tyre e^1 of narrow flat formation and a reduced web e^2 which is formed with inwardly open radial slots e^3 and intervening radial bearing fingers e^4 disposed in star formation. The fingers are further formed on each of the opposite faces of the disc with inner and outer series of lips e^5 and e^6 disposed in concentric annular formation.

These metallic discs *e* provide a means of locating and spacing the refractory insulating roller sections. Each of these sections consists of an outer tube *f* of interlocking segmental block formation, embraced between an adjacent pair of discs *e* in locating engagement between the two outer series of lips e^6 and the two peripheral tyres e^1, in combination with a coaxial tubular liner *g* likewise embraced between the pair of discs *e* in locating engagement between the inner and outer series of lips e^5 and e^6. The component blocks f^1 of the outer tube sections *f* are made of a high quality refractory material having a low coefficient of expansion, and have interlocking longitudinal joints provided for example by ribs *h* and grooves *i*, whilst the tubular liner sections *g* are formed from a suitable granular or powdered calcined refractory insulating material.

In practice the barrels of these composite rollers are made somewhat longer than the effective width of the furnace chamber *j*. The ends of the rollers enter into cylindrical holes *k* in the side walls of the furnace and are therefore protected by the walls from direct impingement of heat or furnace gases. The holes *k* are of sufficient diameter to maintain an easy working clearance for the rotating live rollers.

The central tubular shaft *a* of the composite roller is fitted at one or at each end, between the end bearing *b* and the end of the roller barrel, with a double set of discs *l m*. The outer disc *l* is screwed or otherwise rigidly and adjustably mounted on the shaft *a*, while the inner disc *m* has a sliding clearance, so that by the introduction of screw compression fittings *n* between these inner and outer discs *l m*, the alternated series

of metallic discs *e* and refractory insulating sections *f g* of which the live roller barrel is composed can be maintained under constant compression to any desired degree.

It will be seen that by reason of the compound tubular form of the refractory insulating sections of the roller, in conjunction with the radially slotted and fingered form of the metallic spacing discs, the requisite highly refractory peripheral bearing surface for the material under treatment, for example the metal sheets *o*, is ensured without liability to excessive loss of heat by drainage through the central shaft *a*. In this way, or roller is provided which combines the maximum heat-insulating efficiency with the requisite heat-resisting quality of the refractory sections, whilst it will further be seen that both the refractory blocks and the metallic spacing discs can be assembled and disassembled with great facility, and that the working life of the metallic discs is considerably increased.

I claim:—

1. A roller for use in a conveyer furnace comprising a series of metallic spacing discs and a series of refractory insulating sections assembled in closely alternated relation on a tubular shaft, said sections being characterized by refractory outer tubes of interlocking segmental block formation in combination with insulating tubular liners, the web of each said disc being formed with inwardly open radial slots and intervening radial bearing fingers and with lips disposed in concentric inner and outer annular series on opposite sides of said fingers for locating support of the insulating tubular liners and of the component segmental blocks of the refractory outer tubes, and said shaft being fitted with a pressure device adapted to maintain the alternated series of discs and tubes in positon.

2. A metallic spacing disc for a conveyer furnace roller of a composite metallic and refractory insulating construction, wherein the web of said disc is formed with inwardly open radial slots and intervening radial bearing fingers, and with lips disposed in concentric inner and outer annular series on opposite sides of said fingers for locating support of the refractory insulating sections of the roller.

3. In a roller for use in a conveyer furnace, the combination with a tubular shaft, of a plurality of spaced metal discs and a plurality of refractory insulating sections assembled with said discs in closely alternating relation on said shaft, said sections comprising refractory outer tubes composed of circumferentially disposed segmental blocks formed with interlocking joints extending from end to end and insulating tubular liners enclosed by said blocks, and a pressure device for maintaining said alternating discs and sections in position.

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