2 Sheets-Sheet-1.

Wilmarth, Hay & Coffin.

Coupling Shafting for Propellers.

No. 19,887. Pat. Apl. 6, 1858.

Fig. 2.

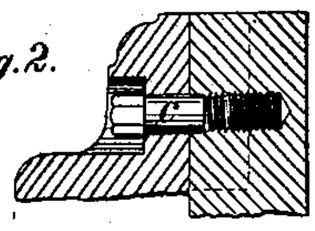


Fig. 1.

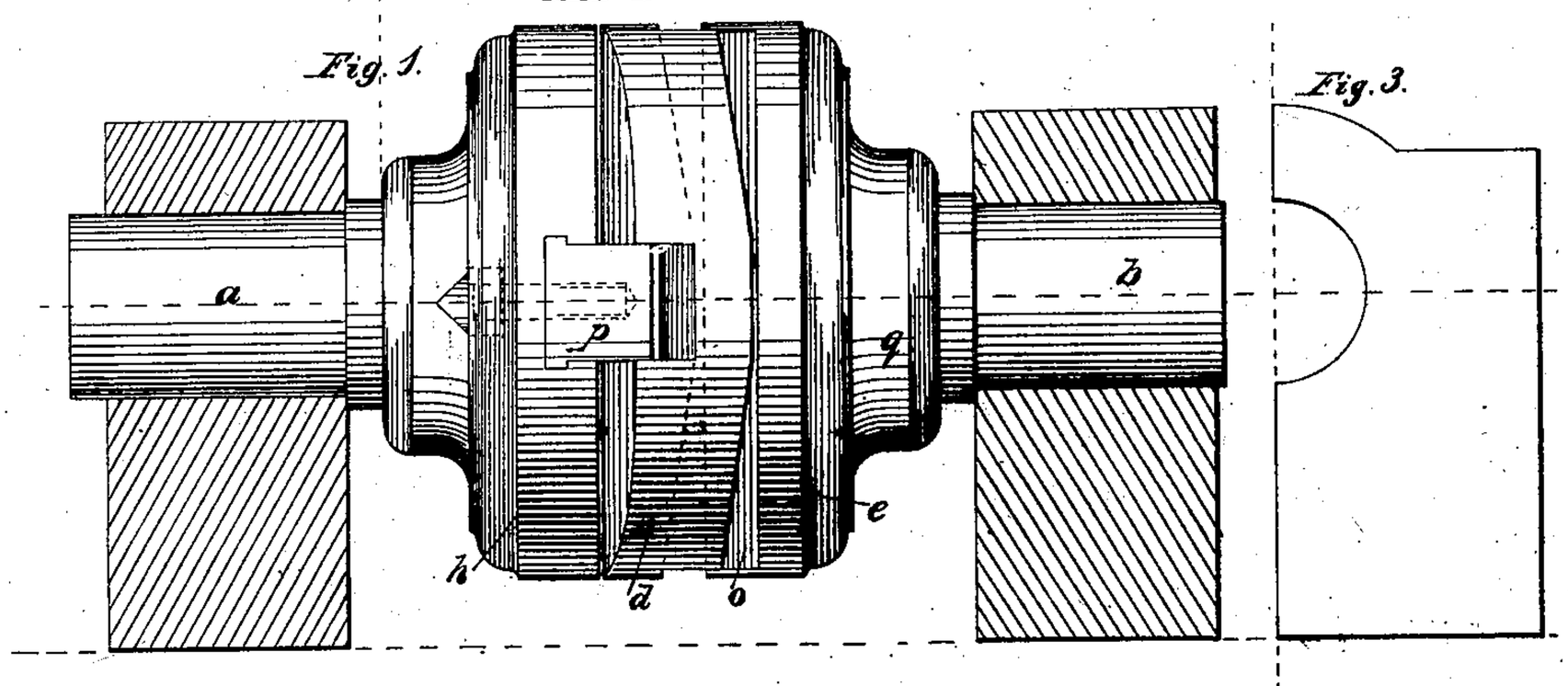
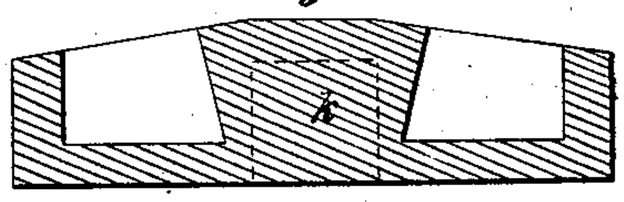


Fig. 3.

Fig. 11.



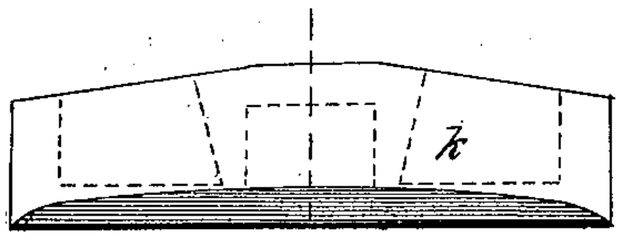


Fig. 9.

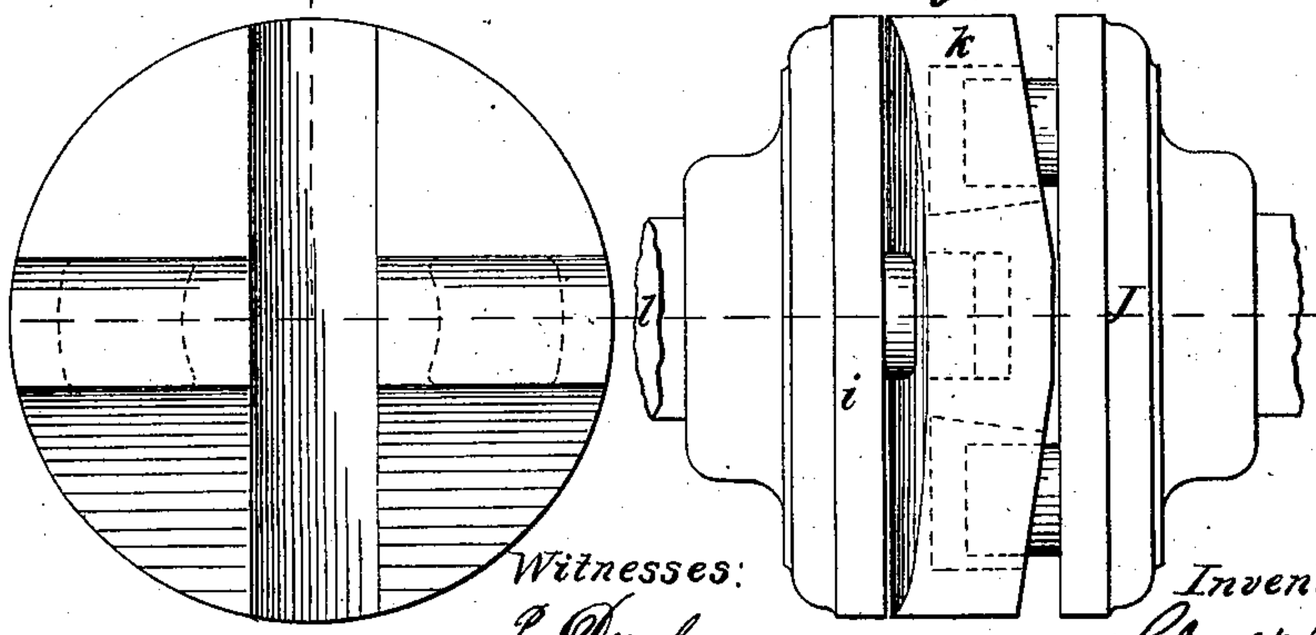
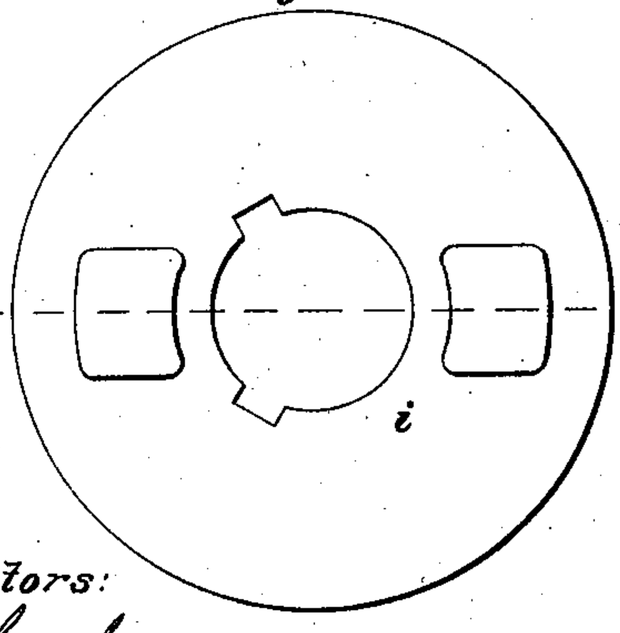


Fig. 13.



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2 Sheets-Sheet 2.

Wilmarth, Hay & Coffin.

Coupling Shafting for Propellers.

No. 19,887. Pat. Apl. 6, 1858.

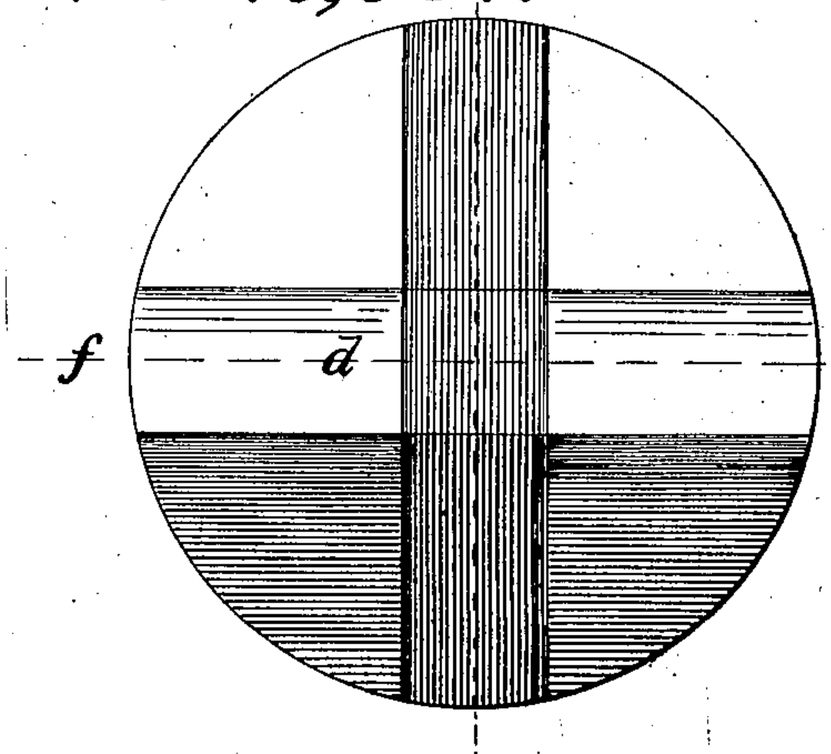


Fig. 6.

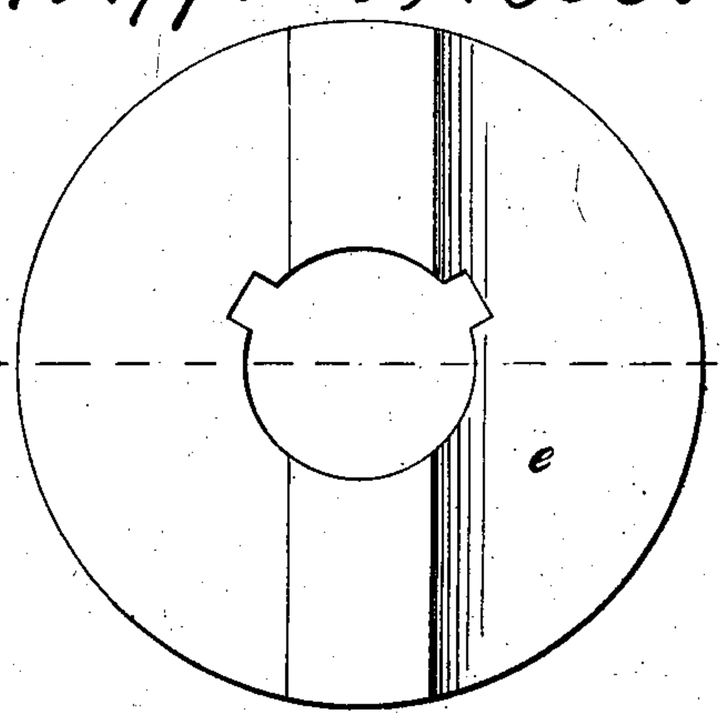


Fig. 7.

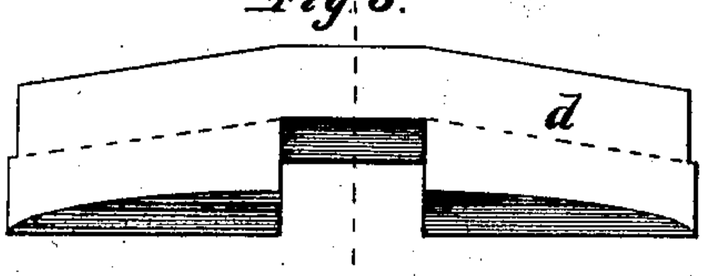


Fig. 14.

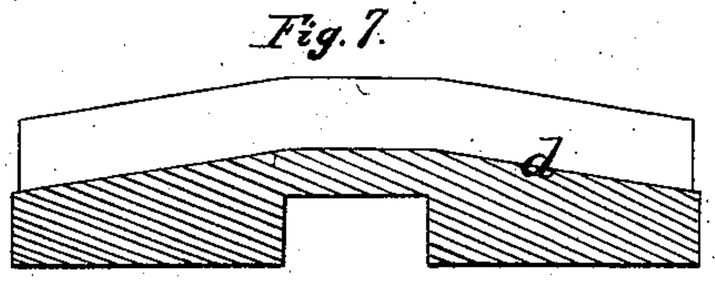
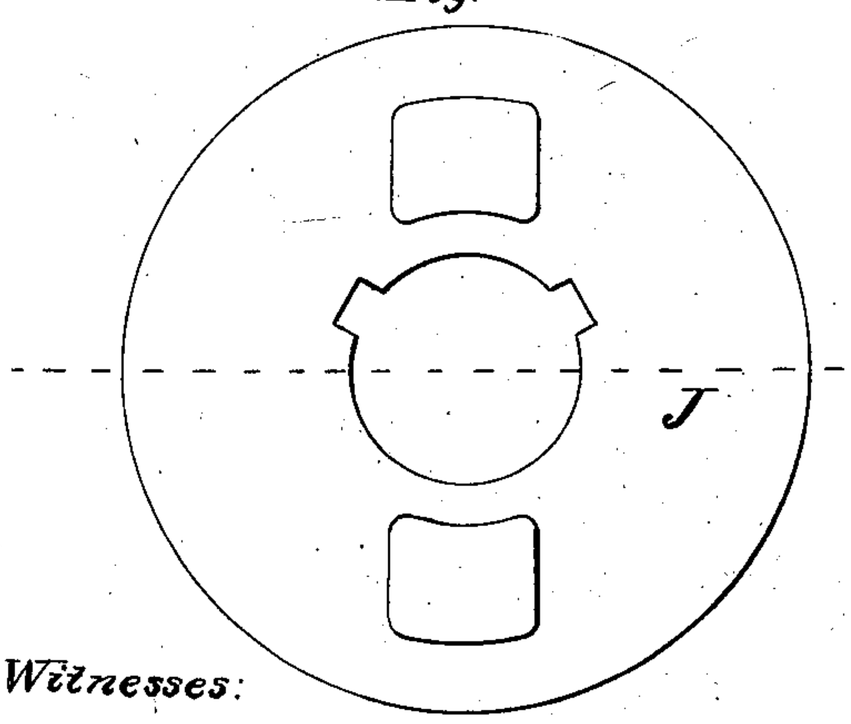
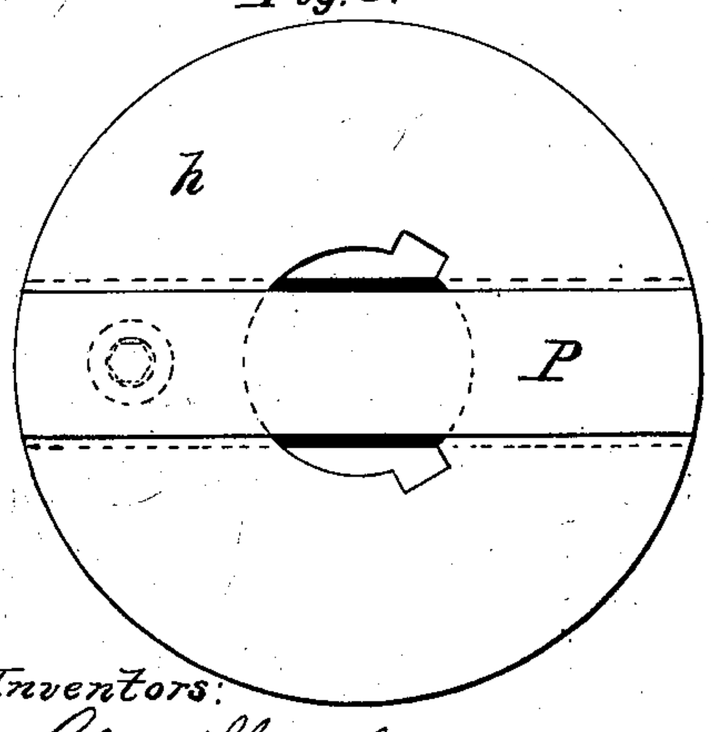


Fig. 8.





Witnesses:

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UNITED STATES PATENT OFFICE.

S. WILMARTH, OF CHARLESTOWN, S. L. HAY, OF READING, AND D. N. B. COFFIN, JR., OF NEWTON, MASSACHUSETTS.

COUPLING OF SHAFTING FOR PROPELLERS.

Specification of Letters Patent No. 19,887, dated April 6, 1858.

To all whom it may concern:

Be it known that we, SETH WILMARTH, of Charlestown, SAMUEL L. HAY, of Reading, and DAVID N. B. COFFIN, Jr., of Newton, all in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Couplings for Shafting; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of this specification, and to the letters of reference marked thereon.

Explanation of drawings.—Figure 1 is a side elevation of the coupling represented as coupling together the adjacent ends of two pieces of shafting lettered respectively *a* and *b*, with sectional view of their bearings. Fig. 2 is a section of head plate *h*, which is keyed in the ordinary manner to *a*, and shows a side view of the screw or pin *c*. Fig. 3 is simply an end elevation of one half of one of the bearings. Fig. 4 is a view of the right hand side of the middle plate *d*. Fig. 5 is a view of the face of head plate *e*. Fig. 6 is a plan of the middle plate *d*. Fig. 7 is a section through plate *d*, on line *f*, *g*. Fig. 8 is a view of the face of head plate *h*. Fig. 9 is a side elevation of one of the various modifications of our improved coupling which may be made, this being better adapted to use in the rough casting perhaps than the other shown in Fig. 1. Fig. 10 is a plan of middle plate *k*. Fig. 11 is a section of the same at line *l*, *m*. Fig. 12 is a view of the right hand side of middle plate *k*. Fig. 13 is a view of the face of head plate *i*. Fig. 14 is a view of the face of head plate J.

Like letters indicate the same part in all the figures.

The object of this invention is to provide for both the angular and the transverse variation at the joints of shafting particularly of propeller shafts in steam vessels. By angular variation we mean the deviation of the shaft from a direct line when the axes coincide at the joint. By transverse variation we mean the want of coincidence of the axes of the two parts of the shaft at the joint.

Steam vessels are not perfectly rigid but must and do on account of their extreme length yield by their tendency to accommodate themselves to the swells through and over which they pass. This of course throws the shafting out of a direct line and causes both the above variations to take place. Now although the common universal joint will provide for the angular, it will not provide for the transverse variation, and therefore, as is the case with most and as we believe all other known couplings, will cause an immense strain both on themselves and on the bearings of the shaft and will also cause the bearings to wear and cut badly. Now our improvement proposes to provide for both of these variations by a very simple and inexpensive combination of parts, whether the variation be changeable or permanent.

That others skilled in the arts to which our invention pertains may be able to make and use our improvement we will proceed to describe the construction and operation of the same.

We provide each of the two ends of the shafting to be coupled together with a circular plate of proper diameter and of suitable thickness for strength. See *e*, Fig. 1. This plate has a hub *q*, into which the end of the shaft is fitted and keyed in the usual manner. Across the face of each plate is arranged a tongue as *o* and *p*, Fig. 1. The surfaces of this tongue are made smooth so as to allow the part operating upon it to slide freely. They may also be hardened. A plate *d*, corresponding in size to *h* and *e*, has a groove upon each of its opposite sides fitted to slide one upon the tongue *o* and the other upon the tongue *p*. These grooves are formed at right angles with each other. The tongues *o* and *p*, may be permanently fast to the head plates *h* and *e*, or one of them may be made removable for convenience of uncoupling, as shown in Fig. 1, Fig. 2, &c., the tongue *p*, being slid into a T-shaped groove in the head plate and kept from sliding out by the screw or pin *c*. See Figs. 1, 2, and 8. The middle plate *d*, has its faces beveled off from near the center each way to the periphery at the ends of the grooves, as shown, and the grooves are made of equal depth from these beveled surfaces and the surface at the middle. These bevels however are not essentials, as the surfaces may be made straight and parallel, or curved and yet answer the purpose.

When it is desired to couple the shafts not already in the bearings, one part of the

shaft as *a*, with its head plate *h*, keyed on, should be laid in the bearings and the tongue *p*, brought to a horizontal position, then one of the grooves in *d*, slipped on to the tongue *p*, after which the part of the shaft *b*, with its head plate *e*, keyed on, may be laid into its bearings, the tongue *o*, sliding vertically into the other groove in *d*, after which, the caps being screwed on to the bearings, the whole is ready to operate. Now by reason of the grooves in *d*, being arranged at right angles with each other and the tongues working freely in the grooves, one part of the shaft, *b*, for instance, may be moved to the right, or left, or up, or down, out of the line of part *a*, and yet *b*, and *a*, be made to revolve freely together, *b*, being driven by *a*, or *a*, by *b*. This is also the case when the two parts of the shaft are placed at an angle with each other, their axes coinciding at the coupling or otherwise. These operations may be understood by reference to the drawings, as the bearing opposite the end which receives the crank is susceptible of being moved to the right or left or swiveled either permanently or variably during the operation by suitably tightening or loosening the screw underneath, by which it is held, and turning the crank with and during these variations. The above result is produced through the swiveling and sliding of plate *d*, upon the tongues *p* and *o*.

When it is desirable to uncouple and disconnect the two parts of the shaft, as is sometimes the case with propeller shafts for steam vessels, without removing them from their bearings, it is simply necessary to take out the screw or pin *c*, when the tongue *p*, can be slid freely out, after which plate *d*, will slide out freely and the parts of the shaft be entirely disconnected. The tongues can of course be made on *d*, and grooves in the other plates, but we prefer the described method.

The modification illustrated by Fig. 9, and details in Figs. 10, 11, 12, 13, and 14, is the same in its most essential features. The principal difference is that the tongues and grooves are not continuous across the faces of the plates, and being formed permanently in and upon them the shaft cannot so readily be uncoupled in the use of them. In this form a good coupling can be made for many purposes by casting simply, with only the exception of boring and keying to the shaft.

Having thus described our improvements what we claim as our invention and desire to secure by Letters Patent is as follows:

We claim the combination of plate *d*, or its equivalent with the head plates of the shaft in any manner substantially as described so that the coupling may accommodate itself to the angular and transverse variation between the driving and driven parts of the shaft whether that variation be variable or permanent.

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