Aug. 10, 1954 C. HASTIE 2,686,069

SHIP PROPELLER KEY CONSTRUCTION

Filed Aug. 11, 1950

Fig. 1

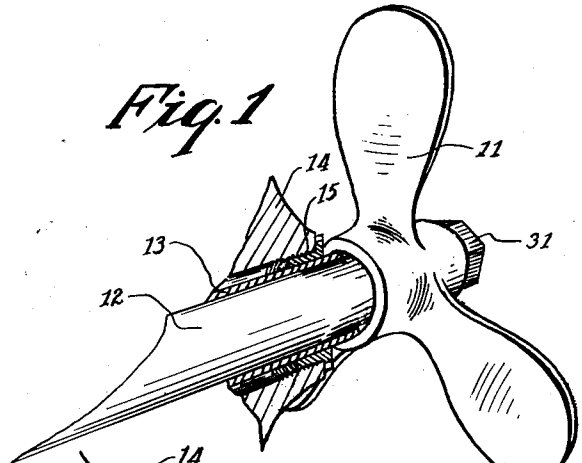


Fig. 2

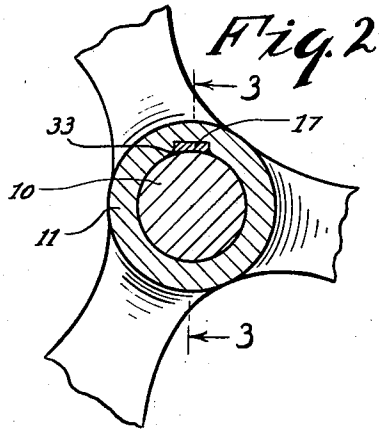


Fig. 3

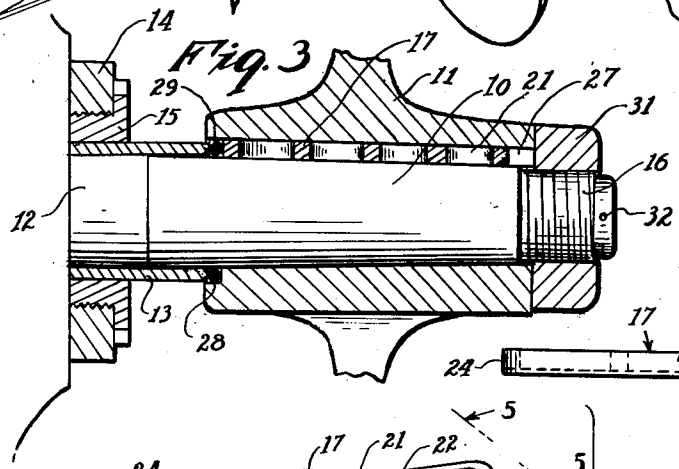


Fig. 5

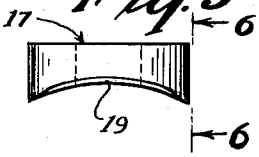


Fig. 6

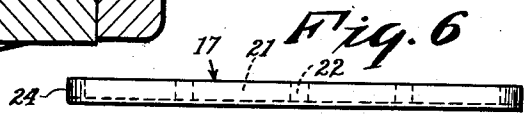


Fig. 4

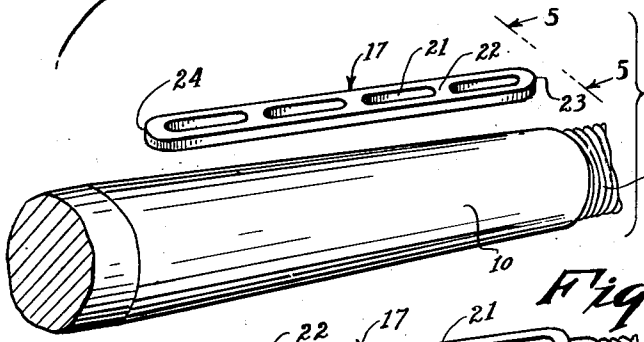


Fig. 9

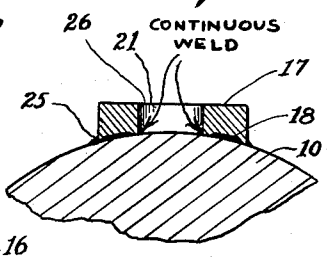


Fig. 7

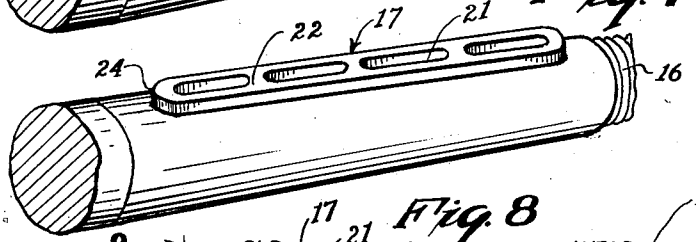
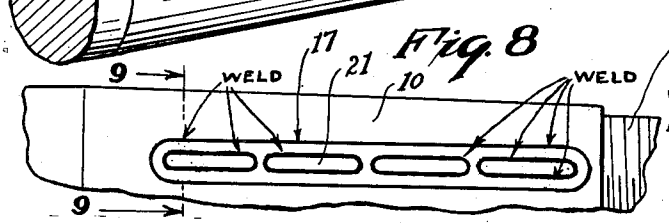


Fig. 8



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SHIP PROPELLER KEY CONSTRUCTION

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2 Claims. (Cl. 287—53)

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This invention relates to ship propellers and their connection with the propeller shafts.

Ship propellers, under the present practice, are connected by a key which is fitted partly in a slot in the propeller shaft and partly in a slot in the hub of the propeller. It has been determined that the failure of propeller shafts has resulted more often within the corners of the slot which has been cut into the propeller shaft. Inasmuch as these slots have to be cut into the surface of the propeller shafts, the propeller shafts are weakened. The cross-sectional area of the shaft is accordingly diminished. Stresses are induced in the shaft which contribute eventually to shaft breakage in service.

It is accordingly the principal object of the present invention to provide a key arrangement for effecting the connection of a propeller to the propeller shaft wherein the surface of the propeller shaft does not have to be cut to receive the key and wherein the key is made an integral part of the propeller shaft and projecting wholly from the surface thereof.

It is another object of the present invention to provide a ship propeller key which is adapted to be secured to the surface of the conical or tapered end of the propeller shaft by welding in way of the openings of the key and finally welding a sealing bead around the external periphery of the key.

Other objects of the present invention are to provide a welded key arrangement for the connection of ship propellers to the propeller shaft, which is of simple construction, inexpensive to form, permits easy assembly of the propeller upon the shaft, and particularly eliminates cutting a channel or key bed in the shaft, easy to inspect and efficient in operation.

For other objects and for a better understanding of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawing in which

Fig. 1 is a perspective view of one end of a propeller shaft and of the propeller connected to the same with the bearing structure for the shaft being broken away and shown in section.

Fig. 2 is a transverse sectional view taken through the propeller and shaft.

Fig. 3 is an enlarged fragmentary longitudinal sectional view taken generally on line 3—3 of Fig. 2.

Fig. 4 is a collective view, in perspective, of the tapered end of the propeller shaft and of the key lifted thereabove.

Fig. 5 is an enlarged end view of the key taken

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generally on line 5—5 of Fig. 4 and looking in the direction of the arrows thereof.

Fig. 6 is a longitudinal view of the key looking generally on line 6—6 of Fig. 5.

Fig. 7 is a fragmentary perspective view of the tapered end of the propeller shaft with the key secured thereto.

Fig. 8 is a fragmentary plan view of the shaft with the key secured and looking down upon the top of the key.

Fig. 9 is an enlarged fragmentary sectional view taken generally on line 9—9 of Fig. 8.

Referring now to the figures, 10 represents the tapered end of a propeller shaft of a ship to which a propeller 11 is to be attached. The tapered portion 10 extends from the main portion 12 of the shaft. This main portion 12 is journalled in a sleeve 13 which is secured in a bearing block 14 by a sleeve bearing nut 15.

The outer end of the tapered portion 10 of the shaft is threaded, as indicated at 16.

Fixed to the surface of the tapered portion 10, by welding and in a manner to be described, is my key 17. This key has its bottom surface machined to conform to the conical surface of the tapered portion 10 to fit the same in a flush manner. This engaging surface is relieved by recesses 18, as shown in Fig. 9, to make certain the proper engagement of the under surface of the key with the surface of the tapered portion 10. The radius of cut upon the under surface of the key is greater for the outer end of the key than for the inner end next to the bearing. This under cut surface is shown in Figs. 5 and 9, and as indicated generally at 19.

The key 17 has a plurality of longitudinally spaced elongated slots or openings 21 separated by intermediate portions 22. The ends of the key 17 are rounded, as indicated respectively at 23 and 24.

When the key is laid upon the surface of the tapered portion, connection is effected therewith by a welding, indicated by weld lines in Fig. 8, extending about the periphery of the slot. This makes an integral connection of the key with the shaft and without having to cut through the surface of the shaft thereby to have weakened the same.

A light continuous sealing weld, as indicated at 25, is extended about the outer periphery of the key 17 whereby to prevent the leakage of water under the key. The welds within the slots 21 are made heavier and also serve to seal off the under surface of the key against the passage of water.

This weld within the slots is of the fillet or bevel type, as indicated at 26 in Fig. 9.

The propeller 11 has a slot 27 cut to receive the key 17. The inner end of the propeller hub is recessed, as indicated at 28, to receive a sealing member 29. This sealing member is compressed as nut 31 on the threaded portion 16 of the shaft is tightened to bring the sealing member against the end of the bearing sleeve 13. A pin may be extended through hole 32 in the end of the shaft to hold the nut 31 against axial displacement thereupon.

In order that the slot 27 of the propeller hub will receive the light weld 25, the edges of the slot are nubbed or cut away, as indicated at 33.

It will now be apparent that there has been provided a key arrangement whereby the need for providing a cut in the propeller shaft has been eliminated and wherein the key is connected to the cone surface of the propeller shaft.

While various changes may be made in the detail construction, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claims.

I claim:

1. In combination, a shaft having a tapered shaft end, a key having its under face arcuately cut, the transverse radius of the arc varying longitudinally along the key to conform to the surface of the tapered shaft end, said key having a plurality of elongated slots spaced from one another with intermediate portions therebetween, a continuous weld surrounding the inner periphery of said elongated slots and securing the key to the surface of the shaft, a light sealing weld surrounding the outer periphery of the key and securing the key on the shaft surface, a hub having an opening therein with a keyway slot for receiving said key and means for securing said hub upon said shaft against axial displacement therefrom.

2. In combination, a shaft having a tapered end, a key having its underface arcuately cut, the transverse radius of the arc varying longitudinally along the key, to conform to the surface of the tapered end, said key having an opening, a weld on the inner periphery of said opening and securing the key to the surface of the shaft, a weld on the outer periphery of the key and further securing the key to the surface of shaft, a hub having an opening therein with a keyway slot for receiving said key and means for securing said hub upon said shaft against axial displacement therefrom.

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