No. 636,411. Patented Nov. 7, 1899.

L. D. LOVEKIN.

SHAFT COUPLING.

(Application filed Aug. 7, 1899.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

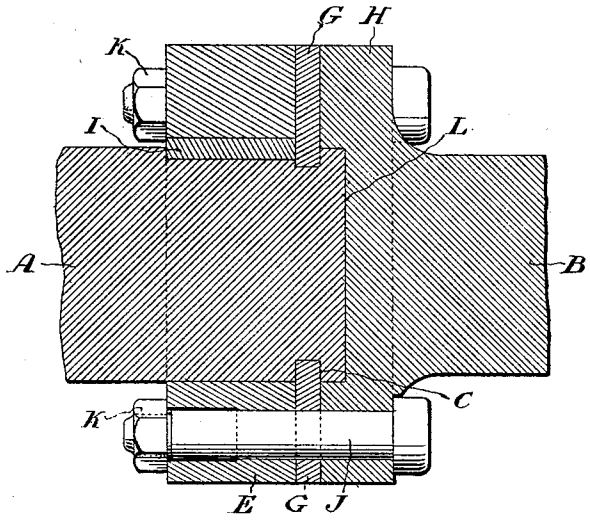
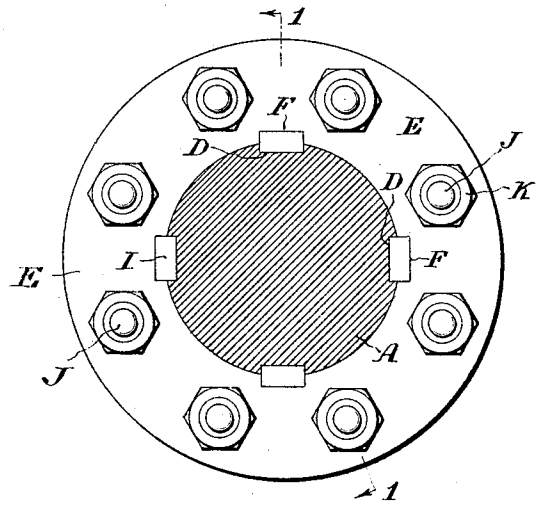


FIG. 2.



Luther D Lovekin

INVENTOR:

by his attorney

Wm C Strawbridge

WITNESSES:

Arthur E. Paige

F. Norman Dixon

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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FIG. 5.

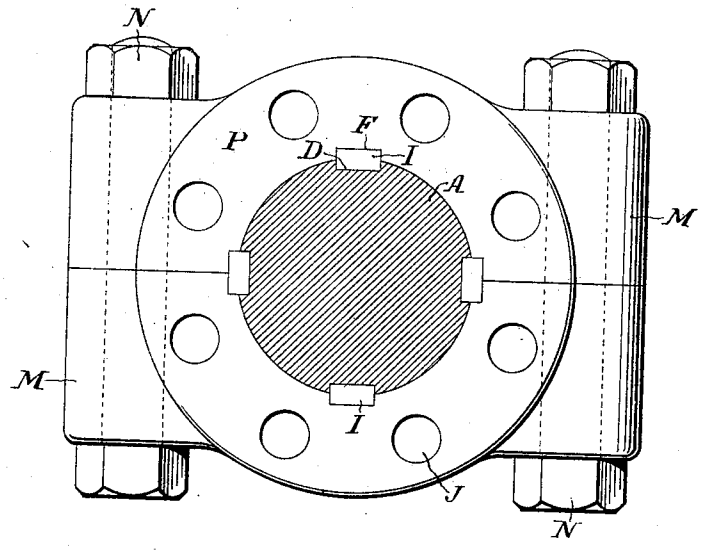


FIG. 3.

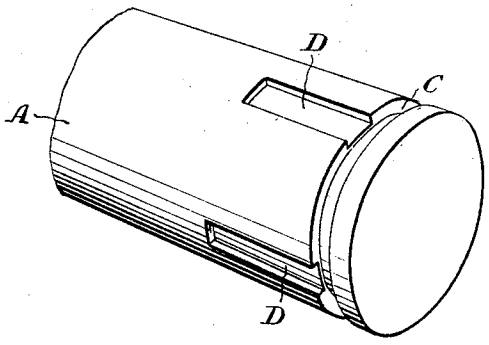
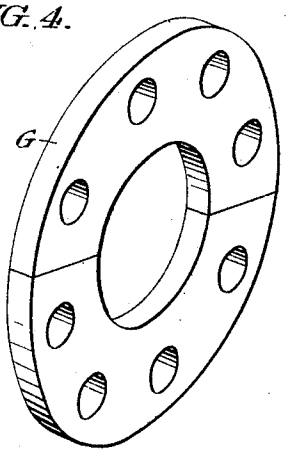


FIG. 4.



WITNESSES:

Arthur E. Paige

F. Norman Dixon

Luther D. Lovekin

INVENTOR:

by his attorney

Wm. C. Strawbridge

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LUTHER D. LOVEKIN, OF PHILADELPHIA, PENNSYLVANIA.

SHAFT-COUPLING.

SPECIFICATION forming part of Letters Patent No. 636,411, dated November 7, 1899.

Application filed August 7, 1899. Serial No. 726,397. (No model.)

To all whom it may concern:

Be it known that I, LUTHER D. LOVEKIN, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Shaft-Couplings, of which the following is a specification.

My invention, which relates generically to the coupling of shafts of all kinds, is of especial applicability and utility in connection with propeller shafts.

In the mounting and disposition of propeller shafts within the hulls of vessels, the shaft tunnel, which extends through the stern of the vessel, is made of such dimensions as to fit as snugly as possible about the propeller shafting.

That section or portion of the propeller shafting which extends through the stern of the vessel and on which the propeller is mounted herein termed the propeller section, is in the assemblage of the parts, inserted within the shaft tunnel from the exterior of the vessel.

Consequently, it is a desideratum that the coupling by means of which said propeller section is united to the body of the propeller shaft shall be of such character as to involve, on the one hand, no such extensive and deep channeling or scoring, or reduction of diameter, as will diminish materially the strength of the propeller section, or, on the other hand, no such permanent lateral extensions as to interfere with the freedom of movement of the propeller section inward and outward through its tunnel when said section is originally inserted or when it is removed for repairs and replaced.

The body of the propeller shaft, as to the section within the hull of the vessel, and to which the propeller section is coupled, is not attended by the conditions which as stated attach to the propeller section, and therefore its end, adjacent to the propeller section, may have such enlargements or collars as may be desired.

It is the object of my invention to provide a coupling which may be employed to unite the propeller section to the body section of a propeller shaft, and which is not only simple, inexpensive, strong, and rigid, but embodies so far as its relation to the propeller section is concerned, the desiderata above mentioned.

It is the especial object of my invention to provide a coupling of the character referred to, in which the usual circumferential locking channel and the locking ring which fits therein, are so arranged with relation to the other parts of the coupling, that the weakening effect of said channel upon the part of the propeller shaft which receives the torsional strain, incident to the driving of said section, is avoided.

In the accompanying drawings I show, and herein I describe, a good form of a convenient embodiment of my invention, the particular subject-matter claimed as novel being hereinafter definitely specified.

In the accompanying drawings,

Figure 1 is a longitudinal, sectional, elevation, on the dotted line 1 1 of Figure 2, of the adjacent ends of the body section and propeller section of the propeller shaft illustrating said sections as united by my improved coupling devices.

Figure 2 is a view in end elevation of the devices shown in Figure 1, sight being supposed taken toward the left hand end of said Figure 1.

Figure 3 is a view in perspective of the inner end of the propeller section.

Figure 4 is a view in perspective of the locking ring.

Figure 5 is a view in end elevation of devices embodying my invention arranged in slightly modified form.

Similar letters of reference indicate corresponding parts.

In the accompanying drawings,

A indicates the propeller section, and B the body section, of a propeller shaft, said sections being shown as united by my improved coupling.

The inner end of the propeller section is formed with a circumferential locking channel C, of slight breadth and depth, and a series of longitudinally extending key seats D which open as to their inner ends into said locking channel, said channel being between the key seats and the adjacent end of the shaft.

E is an annulus, having a bore of diameter corresponding to the normal diameter of the

propeller section A, and adapted to be seated upon said propeller section over the region occupied by the key seats D, said annulus being itself provided as to its bore with key seats F corresponding to those in the propeller section.

Keys I engaged in the key seats D F very firmly secure the annulus in position upon the propeller section as shown in the drawings.

In the application of the annulus and keys the keys are first mounted in the key seats D and the end of said propeller section A with the keys thus mounted in position,—the locking ring not being seated in its recess until after the annulus is in position,—is inserted through the annulus which is, of course, maintained in such position that the keys, in the passage of the propeller section, register with and engage in the key seats F.

G is what I term a locking ring, being an annular structure formed in two sections and having a bore or central opening of diameter corresponding to the reduced diameter of the shaft A at the base of the channel C.

The locking ring is of breadth equal to the breadth of the channel C and when seated in said channel tightly and closely fits within and fills the same.

The body section B of the propeller shaft is provided at its outer end with a collar H the circumferential dimensions of which are, similarly to the circumferential dimensions of the locking ring, the same as the circumferential dimensions of the annulus, so that when the annulus, locking ring, and collar, are assembled as shown in Figure 1 they present a practically continuous exterior.

The end of the shaft B embodies a recess L of the same diameter as the inner end of the shaft A, and of depth equal to the distance from the inner edge of the channel C to the inner end of said shaft A, in which recess the end of said shaft A is snugly and tightly fitted.

Bolt holes extend through the annulus, locking ring, and collar, through which bolts J secured by nuts K, or otherwise are shown as introduced to lock said annulus, ring, and collar firmly together.

The rotation imparted by the engine to the body of the propeller shaft is communicated to the propeller section through the annulus, which for transmitting such rotation, acts upon said propeller section through the keys I.

Said annulus in transmitting the rotation, subjects the propeller section to very heavy torsional strain.

Inasmuch, however, as the locking channel is between the annulus and the inner end of the propeller shaft, and not between the annulus and the propeller, said channel does not operate in my improved coupling to diminish the strength of the propeller section in that region which is subjected to the direct torsional strain due to the actions of the engine.

In the use of couplings in connection with shafts in which, unlike my improved arrangement, the locking channel is between the annulus and the propeller, it has been necessary to employ propeller sections of much greater diameter than would be otherwise required, in order to allow for the reduction in strength occasioned by said locking channel.

It is, of course, immaterial whether the annulus be made as a continuous ring structure, as shown in Figures 1 and 2, or, similarly to the locking ring, in two parts, and provided with means to effect their union,—and in Figure 5, I have illustrated a construction in which the annulus (designated P in said figure) is shown as composed of two semi-circular sections, united, through matching lugs or ears M, by bolts N passing through said lugs or ears.

Of course, any preferred device mounted on or connected with the shaft B may be employed in lieu of the collar exhibited, and any preferred means employed in lieu of the bolts J.

Having thus described my invention, I claim—

1. A shaft section having a longitudinally extending key seat and an annular locking channel, the channel being between the key seat and the adjacent shaft end, a locking ring mounted in said channel, an annulus encircling said shaft and equipped with a key engaged in said key seat, a second shaft section, and means for engaging said annulus and locking ring with said second shaft section, substantially as set forth.

2. In combination, a shaft section having an annular locking channel and a series of key seats near its end, the channel being between the key seats and the adjacent shaft end, a locking ring mounted in said channel, an annulus on said shaft provided with keys adapted to said key seats, and a second shaft section provided with a lateral enlargement and with a recess for the end of the shaft section first named, and means for connecting said annulus to said lateral enlargement, substantially as set forth.

3. In combination with a shaft having an end recess, and lateral enlargements or extensions, a second shaft the end of which is fitted within the end recess of the shaft first mentioned, and which second shaft is provided near its end with a series of longitudinally extending key seats and a locking channel which channel is located between the key seats and the shaft end, a locking ring mounted in said locking channel, an annulus provided with keys which annulus is mounted on said shaft in such position that its keys engage in said key seats, and a series of bolts passing through the lateral enlargements of the first named shaft and through the locking ring and annulus of the second named shaft, substantially as set forth.

4. In combination with a shaft having an annular locking channel near its end and a series of key seats opening into said channel, and extending from said channel away from

said end, a second shaft, having an end recess, into which the end of the first mentioned shaft projects, and a collar or lateral enlargement, a locking ring mounted in said channel, an annulus mounted on and keyed to the shaft first named, and means for connecting said annulus and collar, substantially as set forth.

5. A shaft section having an annular locking channel near its end, and a series of key seats opening thereinto and extending from such channel away from said end, that portion of the shaft section between the channel and the end of the section being unrecessed and of the normal circumference of the section, and that portion of the section in which the key seats are formed being likewise except for said seats of the normal circumference of the section, a second section provided with a collar or enlargement, coupling devices which engage and fit within the annular recess and the key seats, and bolts which connect said coupling devices with the collar or enlargement of the second shaft section, substantially as set forth.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 4th day of August, A. D. 1899.

LUTHER D. LOVEKIN.

In presence of—

F. NORMAN DIXON,

THOS. K. LANCASTER.