S. T. SMITH
SINGLE BAR SHAFT LOCK
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Fig. 3

Fig. 4

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This invention relates to an improvement of my former locking device as set forth in Patent No. 1,885,349, dated Dec. 8, 1931, providing means for applying a single lock bar to abutting power shafting sections.

The object of my invention is to provide a simple locking unit for drive shafting for preventing backward rotation thereof when an excessive force is applied through the driven shaft unit as may be attached thereto.

Another object is to provide a single lock bar shaft connector, capable of functioning freely in either direction when the turning power is applied thereto through the driving shaft section, but will automatically lock within the supporting fixedly mounted housing if a turning force is applied thereto through the connected driven shaft section.

A further object is to provide a shaft locking unit for abutting shaft sections, adapted for installation within any driving shaft line adaptable to a fixed housing connecting case.

These several objects are attained by the construction and arrangement of parts more fully hereinafter set forth.

Similar parts on all drawings are marked by similar numerals or letters.

Fig. 1 is an elevation of the shaft locking unit, showing the exterior structure and means for applying same to abutting shaft sections.

Fig. 2 is an end view taken on the line 2—2 of Fig. 1, showing the general housing formation.

Fig. 3 is a sectional view, except for the central shaft and locking units, taken on the line 3—3 of the Fig. 2, showing the general arrangement of the various operating parts.

Fig. 4 is a cross-sectional view taken on the line 4—4 of the Fig. 3 showing the relative position of the locking bar and operating shaft lugs engaging therewith, and illustrates the application of the displacement spring mounted thereon.

Figs. 5 and 6 illustrate the preferred lug design for the driving shaft section.

Figs. 7 and 8 illustrate the lug design for the driven shaft section.

Figs. 9 and 10 show the detailed construction of the locking bar unit.

Figs. 11 and 12 are modified sectional views similar to Figs. 3 and 4, showing the same device adapted to a continuous drive shaft section.

The general construction of my improved shaft lock comprises a fixedly mounted housing formed with a cylindrical chamber concentric with the end shaft bearings, positioned centrally therebetween, and provided with shaft sections mounted within each of said end bearings. A locking bar is mounted within the housing chamber, and each shaft section is provided with a projected lug for engaging the lock bar from opposite directions for displacing same within the housing chamber for locking or unlocking the bar therewith.

I will now describe more fully the detailed construction of my device referring to the drawings and the marks thereon.

The housing A is preferably formed of a cylindrical brake ring 1 with end bearing caps 2 and 3 rigidly mounted on opposite ends thereof by suitable stud bolts 4. The brake ring 1 is formed a true cylindrical section, preferably with hardened and ground inner cylindrical surface a. Both end bearing caps 2 and 3 are likewise turned cylindrical sections concentric with the housing chamber, and are preferably provided with suitable roller bearings 5. The bearing cap 3 is formed with a flat end wall b positioned at right angles to the shaft axis, and is provided with suitable anchor bolt holes 6 for fixedly attaching the housing A to some supporting wall C, thus retaining the housing in a rigid position. Within the housing brake ring 1 is mounted a locking bar 7 diametrically thereacross, and is formed with extended cylindrical end surfaces e turned to a diameter slightly less than the inclosing brake ring surface a, allowing a slight bar displacement to one side of the housing chamber center-line, designed and positioned to form contact with the brake ring surface a at a predetermined locking angle whenever the lock bar is so displaced sidewise transversely of the shaft axis by an externally applied force. A driving shaft 6 is rotatably mounted through the end bearing cap 2, and a corresponding driven shaft 8 likewise rotatably mounted through the opposite end bearing cap 3, as illustrated in Fig. 3 of the drawings. Each shaft section 6 and 8 is provided with projecting collar d and e respectively, for retaining said shaft sections in a predetermined position within the housing chamber B. The driving shaft collar d is provided with an extended sectional tubular lug f projected from the inner face thereof positioned on one side, flush with the collar rim but concentric with the shaft axis, designed to fit and engage the lock bar edge g for disengaging same from its locking position with the lock ring 1 and allowing free rotation of the lock bar 7 within the housing chamber B.
Likewise the driven shaft collar e is provided with a similar sectional tubular lug h designed to the smaller collar e, positioned to engage the opposite lock bar edge k and automatically displace said collar to the opposite side of the shaft axis to the locking position within the ring i whenever a turning force is applied thereto through the driven shaft section 9. The lock bar 7 provides a rigid member between the overlapping tubular lugs j and h and functions as a turning unit for connecting the shaft ends operatively within the housing chamber 8 whenever the lock bar 7 is in its free rotating position.

If desired, a stressed displacement spring 15 may be inserted on either side of the lock bar 7, positioned therewith to engage either one of the operating lugs, for retaining said bar under a predetermined pressure in either its centralizing or its locking position within the inclosing chamber walls, when otherwise unrestrained, thus controlling the lock bar operations for all initial moderately applied turning forces, illustrated in Figs. 3 and 4 of the drawings for there centralizing the lock bar unit.

It can readily be seen that when a rotating force is applied through the driving shaft 5, the attached lug 7 will automatically displace the lock bar 7 sidewise transversely of the shaft axis to its free turning position within the housing chamber, if not already so displaced by the spring 15 when used, and there engage the opposing collar lug h for transmitting the driving power and rotating the connected driven section 9 therewith. However, any opposing rotating force as may be applied to the lock bar 7 through the driven shaft section 8 will forcibly displace the lock bar 7 sidewise transversely of the shaft axis to its locking position within the housing ring 1, unless previously so displaced by an oppositely applied spring 15, automatically locking with the housing chamber walls a and preventing any further rotations of the shaft sections mounted therein.

The Figs. 11 and 12 illustrate a slight modification of locking unit, formed with the driving shaft 8a extended through the entire housing section, and with the driven unit 9a formed of a tubular construction and rotatably mounted thereon, providing means for attaching any driving unit thereto through the attached keys 10, or any other suitable means. The operation is exactly the same as heretofore described.

The Figs. 13 to 15 illustrate a simplified construction of the same device as applied to straight shaft sections 9b and 8b inclosed in a correspondingly straight tubular housing Aa. The housing is retained in a predetermined position on the assembled shaft sections by means of bearing recesses 18 and inclosed bearing balls 11 mounted therein after assembly through the connecting screw holes 12. The operation is the same as in the former cases.

Having fully described my single bar shaft lock, what I claim as my invention and desire to secure by Letters Patent is:

1. A bar shaft lock adapted for preventing backward rotation of a connected driven section, comprising a rigidly mounted housing formed with a central cylindrical chamber having connected shaft bearings at opposite housing ends positioned concentric with the chamber axis, a driving shaft section and a driven section operatively connected thereto, said lock bar being designed and positioned to engage the chamber walls at a locking angle and positioned between the overlapping operating lugs in a manner capable of being displaced sidewise thereby transversely of the shaft axis as pressure is applied thereto through either of the shaft sections, for respectively locking or releasing said lock bar with the chamber walls.

2. A bar shaft lock adapted for preventing backward rotation of a connected driven section, comprising a rigidly mounted housing section formed with a central cylindrical chamber having shaft bearings at opposite ends thereof concentric with the chamber axis, a driving shaft section and a driven section each formed with an end collar and projected tubular operating lug sections, rotatably mounted within the opposite end bearings, positioned with their respective lug projections overlapping each other within the chamber recess, a lock bar formed with circular ends rotatably mounted within the housing chamber capable of slight sidewise displacement therein transversely of the shaft axis, said lock bar being designed to engage the chamber walls at a predetermined locking angle and lock therewith when under pressure, and positioned between the projected operating lug ends, in a manner to be displaced sidewise thereby transversely of the shaft axis as pressure is applied thereto through either of the shaft sections for respectively locking or releasing said lock bar from the housing chamber walls.

3. A shaft bar lock adapted for preventing backward rotation of a connected driven sections, comprising a rigidly mounted housing section formed with a central cylindrical chamber provided with bearing openings leading through opposite ends of the housing positioned concentric with the chamber axis, a driving shaft section having a driven section mounted thereon all rotatably mounted within the housing bearings, both driving and driven sections being formed with projected lugs at their inner ends projecting from within the chamber recess, designed and positioned with their respective lug sections separated and overlapping each other, a lock bar formed with circular ends rotatably mounted within the housing chamber positioned between the separated operating lugs, said lock bar being designed and positioned for a slight sidewise displacement within the chamber transversely of the shaft axis and to engage therewith at a predetermined locking angle capable of locking therewith when so displaced by applied pressure from either operating lug for respectively locking or releasing said lock bar with the chamber walls.

4. A bar shaft lock adapted for preventing backward rotation of a connected shaft section, comprising a fixedly mounted tubular housing having a central chamber recess and formed with bearing sections at opposite ends thereof, a driving and a driven shaft section formed with projected but separate end lugs rotatably mounted within the opposite ends of the tubular housing, means for retaining said shaft sections in a predetermined position within the housing, a lock bar formed with circular ends rotatably mounted within the housing chamber positioned between the separate operating lugs, capable of a slight sidewise displacement within the chamber recess transversely of the shaft axis and locking with...
the walls thereof when so displaced by applied pressure from either operating lug for respectively locking or releasing said lock bar with the chamber walls.

5. A bar shaft lock adapted for preventing backward rotations of a connected driven section, comprising a rigidly mounted housing formed with a central cylindrical chamber having connected shaft bearings at opposite ends thereof positioned concentric with the housing chamber axis, a driving shaft section and a driven section rotatably mounted within the opposite end bearings, each section being formed with cylindrical operating lug sections projected from the inner ends thereof within the housing chamber, designed and positioned with their respective lugs separated and overlapping each other, a lock bar formed with circular ends of a diameter slightly smaller than the inclosing chamber, rotatably mounted therein, said lock bar being designed and positioned to engage the chamber walls at a locking angle for locking therewith under pressure, and positioned between the overlapping lugs in a manner capable of being displaced sidewise thereby transversely of the shaft axis as pressure is applied thereto through either of the shaft sections for respectively locking or releasing said lock bar with the chamber walls, and spring means mounted between the said lock bar and one shaft operating lug for retaining said lock bar under pressure in a predetermined position within the housing chamber when otherwise unrestrained.

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