No. 797,292. PATENTED AUG. 15, 1905.

C. F. KRAUT.

REVERSING DEVICE FOR BOATS.

APPLICATION FILED OCT. 18, 1904.

3 SHEETS—SHEET 1.

Fig. 2.

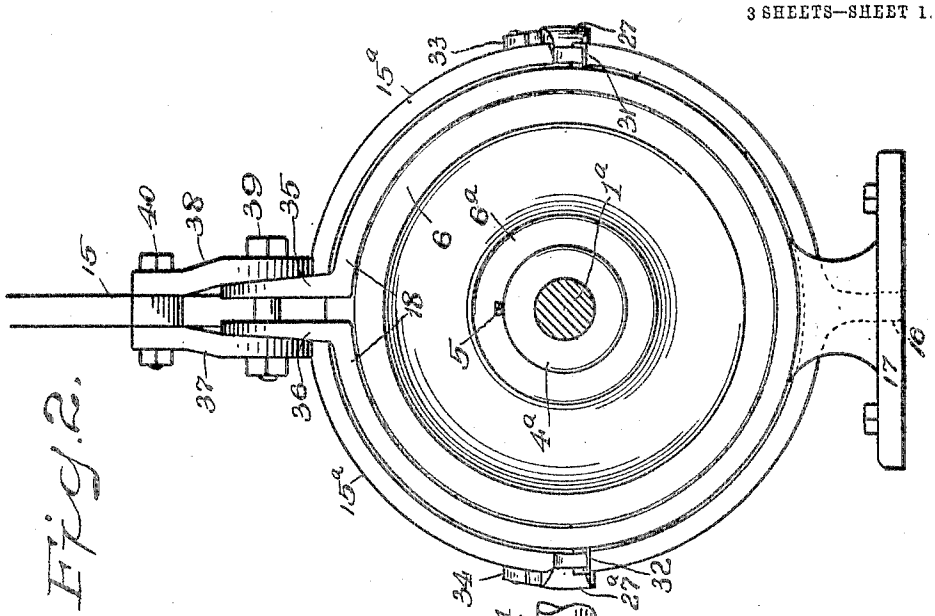
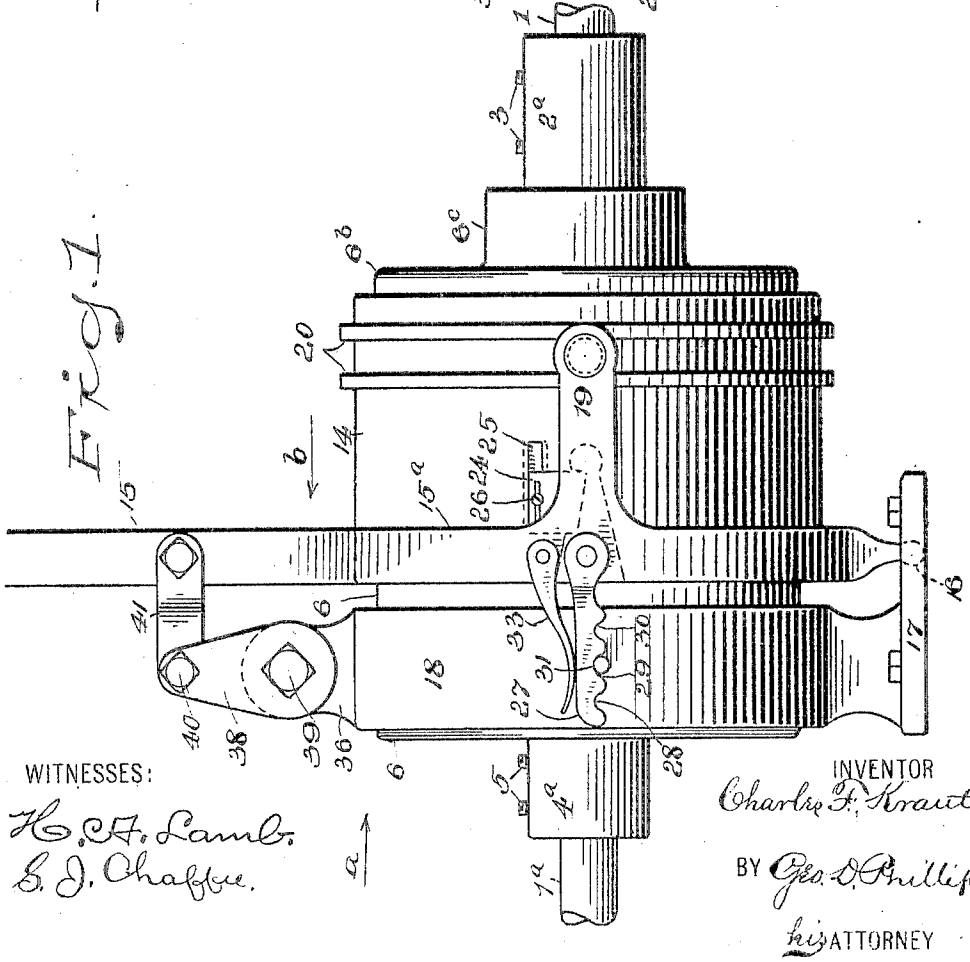


Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 3.

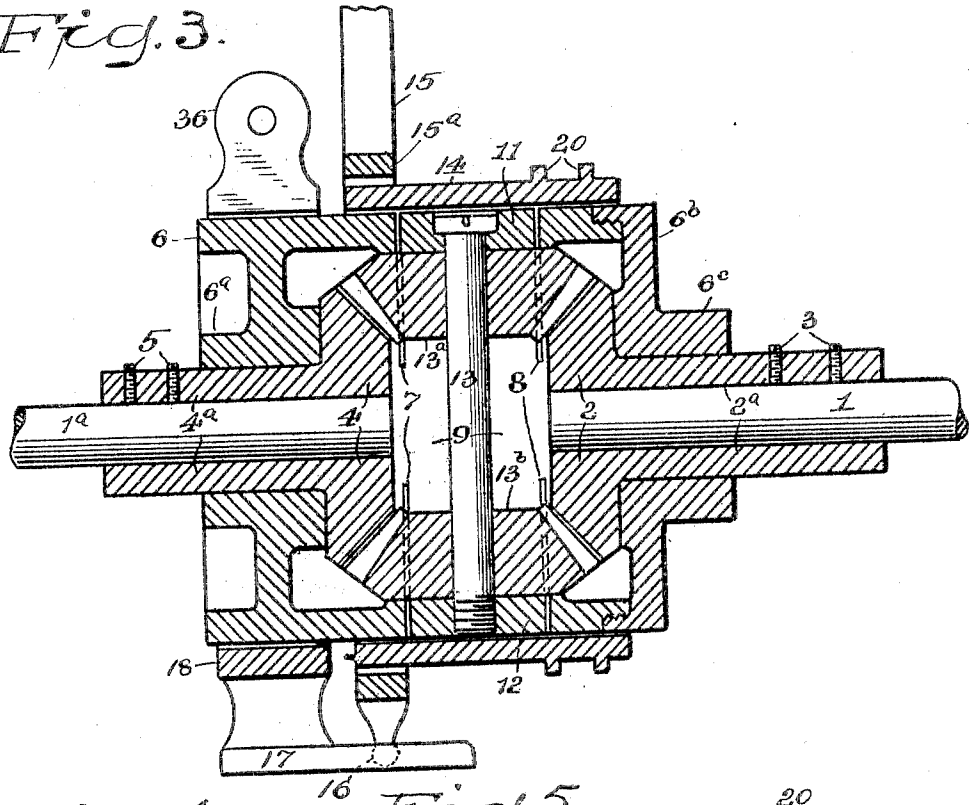


Fig. 4.

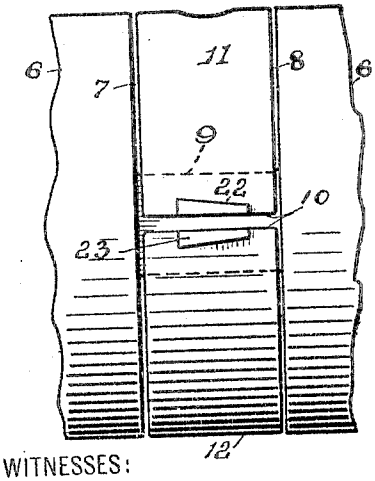
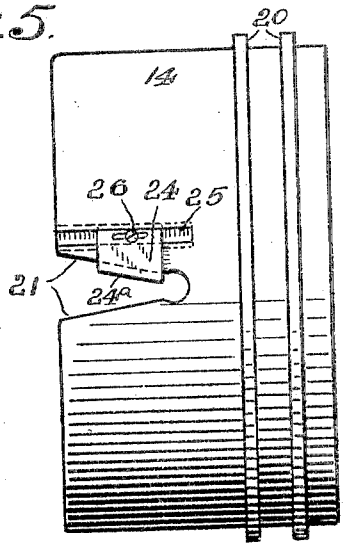


Fig. 5.

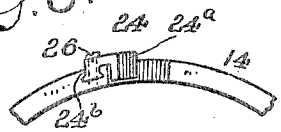


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Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 7.

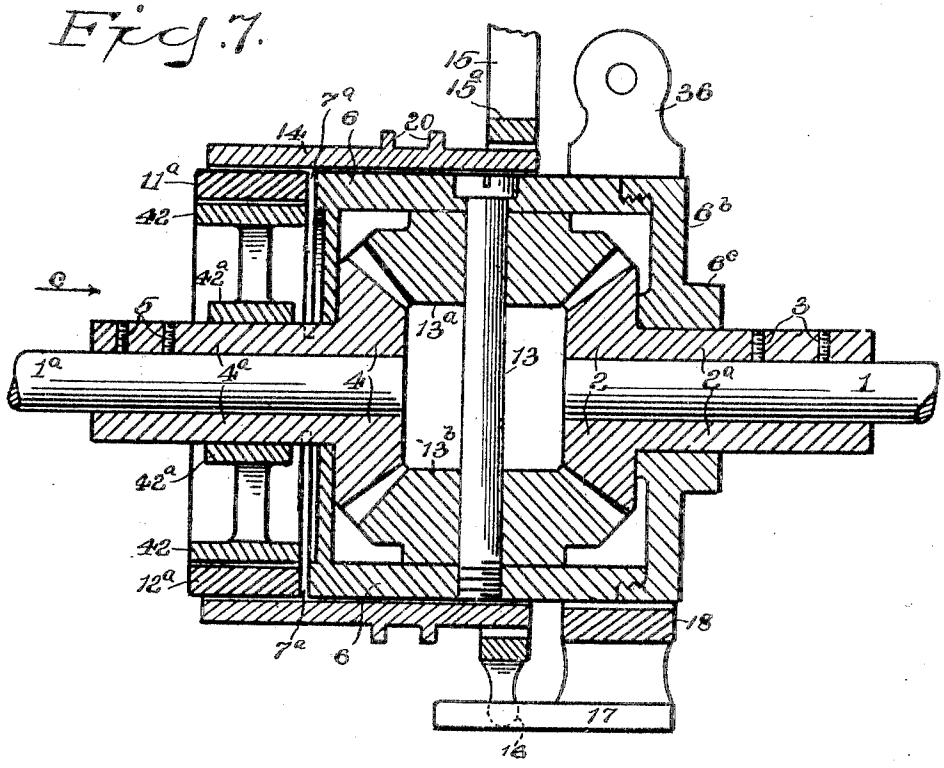
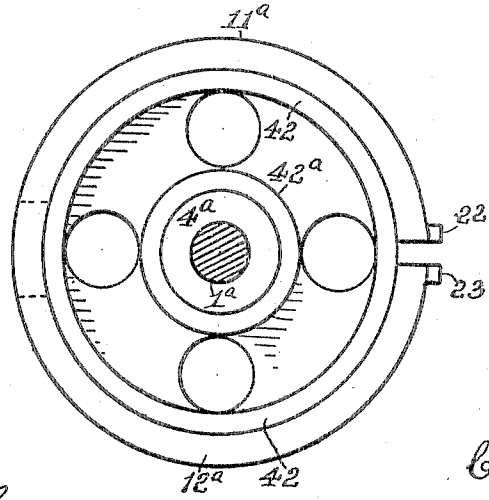


Fig. 8



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UNITED STATES PATENT OFFICE.

CHARLES F. KRAUT, OF BRIDGEPORT, CONNECTICUT.

REVERSING DEVICE FOR BOATS.

No. 797,292. Specification of Letters Patent. Patented Aug. 15, 1905.

Application filed October 18, 1904. Serial No. 228,982.

To all whom it may concern:

Be it known that I, CHARLES F. KRAUT, a citizen of the United States, and a resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Reversing Devices for Boats, of which the following is a specification.

My invention relates to reversing devices for boats; and it consists in certain details of construction to be more fully set forth in the following specification.

To enable others to understand my invention, reference is had to the accompanying drawings, in which—

Figure 1 represents a side elevation of the device, broken view of an operating-lever, and broken view of the engine and propeller shafts. Fig. 2 is an end elevation of the device looking in the direction of arrow *a*, Fig. 1, also broken view of the operating-lever and sectional view of the propeller-shafts. Fig. 3 is a central sectional view of the device and broken view of the operating-lever and the engine and propeller shafts. Fig. 4 is a broken detail side elevation of the housing embracing the box-gears, showing more clearly its compressible feature. Fig. 5 is a detail side elevation of the movable clamping-sleeve adapted to embrace the housing and compress the same. Fig. 6 is a detail broken view of a portion of the clamping-sleeve, showing an adjustable wearing-block thereon. Fig. 7 is a central sectional view of the device, showing a modified construction of clamping feature for coupling the engine-shaft and propeller-shaft together. Fig. 8 is an end view of the clamping-arms and disk for same and sectional view of the propeller-shaft looking in the direction of arrow *c* of Fig. 7.

Its construction and operation are as follows:

1 is the engine-shaft; 2, a bevel-gear having the long hub 2^a. 3 represents screws for securing this gear-hub to the engine-shaft. 1^a is the propeller-shaft, carrying a similar gear 4, having the elongated hub 4^a and the holding-screws 5. 6 is a housing surrounding said gears and having the hub 6^a journaled on the hub of the gear 4. The inner end of this housing is threaded to engage a threaded portion of the flange 6^b, which flange has the hub 6^c journaled on the hub 2^a of the bevel-gear 2. For all practical purposes the flange 6^b and the housing 6 could be made of one piece of metal; but for convenience of construction it is advisable to separate them, as shown.

The central portion of the housing 6 is partially separated from the outer portion by means of the kerfs 7 and 8, leaving only the narrow bridge 9 to connect said central portion with the main body of said housing. The transverse cut or opening 10 opposite said bridge separates this central portion of the housing into the two clamping-arms 11 and 12. 13 (see also Fig. 3) is a bolt or support extending transversely through these arms, with its lower threaded end rigidly secured in the arm 12, while the head and body of this bolt are free in the arm 11. 13^a and 13^b are pinions journaled on said bolt and meshing with the gears 2 and 4.

14, Figs. 1, 3, and 4, is a sleeve embracing the housing 6 and adapted to slide freely thereon. 15 is an operating-lever whose ring portion 15^a embraces said sleeve, but out of direct contact therewith, and it has the ball-shaped end 16 fulcrumed in the foot 17 of the brake-band 18, presently to be described. Projecting from this ring are diametrically-opposed arms, one of which, 19, is shown at Fig. 1, which arms carry rolls adapted to engage in the groove 20 of the sleeve 14.

21 is an angular opening or jaw in the sleeve 14, adapted to embrace the angularly-arranged lugs 22 and 23 on the free ends of the arms 11 and 12 of the housing. (Shown at Fig. 4.)

24 (see also Fig. 6) is an adjusting-block having the angular or inclined face 24^a adapted to engage with the inclined lug of one of the spring-arms of the housing 6. 24^b is a tapered foot of this block adapted to be movably secured in the groove 25 of the sleeve 14 by means of the screw 26, thereby compensating for the wear of the lugs 22 and 23.

27 and 27^a are pawls pivotally supported to the ring 15^a, having the notches 28, 29, and 30, adapted to engage with the pins 31 and 32, projecting from the brake-band 18, and 33 and 34 are springs also pivotally supported on the ring 15 and adapted to secure the engagement of said pawls with said pins.

The brake-band embraces the housing 6 outside of its compressible arms and is provided with the cam-ears 35 and 36, (shown at Fig. 2,) adapted to be embraced by the cam-arms 37 and 38, pivotally connected with the bolts 39 and 40, and 41 is a link connecting these arms with the operating-lever 15.

Operation: To run "straightaway"—*i. e.*,

to rotate the engine-shaft and propeller-shaft in unison—the operating-lever 15 is moved in the direction of arrow *b*, Fig. 1. This movement will release the grip of the brake-band on the housing 6 and also carry the sleeve 14 rearward to bring about the engagement of the angular opening 21 with the lugs 22 and 23 of the arms 11 and 12 and compress said arms, forcing the pinions 13^a and 13^b firmly and immovably in mesh with the gears 2 and 4. When said gears and pinions are thus locked together, the two shafts, the housing 6, and the sleeve 14 will rotate in unison and as one piece. To reverse or rotate the propeller-shaft in the opposite direction, the operating-lever is reversed or thrown in the opposite direction from that above described, which movement will not only release the clamping-arms 11 and 12, which arms, springing outward, will bring the pinions into rotative engagement with their gears, but will also compress the brake-band firmly about the housing 6 to hold the same stationary, thus leaving the pinions free to rotate on the bolt 13 to bring about the reversion of the propeller-shaft. When running ahead, the notches 30 of the pawls 27 and 28 will be engaged with their respective pins to lock the sleeve and housing firmly together. When the notches 28 are engaged with said pins, the sleeve is locked against endwise movement, and when the central notches 29 are engaged the operating-lever will then be in such a position that not only is the sleeve held against endwise movement, but the grip of the brake-band is released, so that the engine-shaft can run idle, while the propeller-shaft remains stationary.

In the modification shown at Figs. 7 and 8 the clamping-arms are transferred from the central portion of the housing 6 to the end of said housing, and such arms will, to avoid confusion, be designated by the numerals 11^a and 12^a. The remaining parts of these views which correspond to similar parts in the other views will of course be designated by the same reference-numerals. 42 is a disk adapted to be frictionally engaged by the arms 11^a and 12^a, which arms are actuated by the sleeve 14 in the same manner as heretofore described for the arms 11 and 12. The hub portion 42^a of this disk is secured to the hub 4^a of the gear 4, so that when the brake-band 18 is released from the housing 6 the sleeve 14 will force the arms 11^a and 12^a into frictional engagement with the disk 42, and thus lock the whole construction together for a straightaway movement. Releasing the grip of these arms and tightening the grip of the brake-band 18 on the housing 6 will permit the gears 13^a and 13^b to rotate, and thus effect a reverse movement of the propeller-shaft. In this modified construction it is only necessary to cut the one kerf 7^a to form the clamping-arms 11^a and 12^a, as shown at Fig. 7.

The construction above described has many important advantages over the reversing devices now in use. In the first place it does away with the intricate internal clutch mechanism commonly used for holding the housing against rotation when reversing, which clutch mechanism slips more or less from constant use, so that the full power of the engine is not utilized in reversing. As a rule reversing devices in boats are not readily accessible, so that when an internal clutch mechanism is used it is extremely difficult to get at in order to adjust it.

In my construction all of the parts requiring any attention whatever are on the exterior of the device and readily accessible. Besides, the novel manner shown of locking the device together by forcing the pinions and gears into non-rotatable engagement with each other obviates all slipping, as it would be impossible to rotate said pinions on their bearings when they are thus locked to the gears. Locking the gears together by means of the clamping-arms is undoubtedly more reliable than frictionally engaging the clamping-arms with the disk, as shown in the modified construction; but the advantage of this latter method over the frictional devices in common use is that the parts are exteriorly arranged and easily accessible and are also cheaply constructed, which are very important features in reversing devices.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a reversing device of the character described, the combination with a driving-shaft and a driven shaft bevel-gears carried thereby, of a housing embracing said shafts and gears and independently journaled about the same, spring-arms formed from said housing and in the body thereof, a sleeve embracing said housing and adapted to have a longitudinal movement thereon, bevel-pinions registering with said gears and rotatably mounted on a support projecting transversely through said arms, said support being anchored in one of said arms but free in the other arm, a brake-band embracing said housing, a reversing-lever connected to said brake-band and sleeve, engaging means on said spring-arms and sleeve so that, when the reversing-lever is actuated in one direction, the brake-band is disengaged from the housing and the spring-arms are compressed by the sleeve to forcibly engage and lock the pinions and gears together, and when said lever is actuated in the opposite direction, the brake-band will engage and hold the housing against rotation and also unlock the pinions, for the purpose set forth.

2. In a device of the character described, the combination with a driving-shaft and a driven shaft bevel-gears carried thereby, of a housing rotatably embracing said shafts and gears, spring-arms in the body of said

housing, bevel-pinions registering with said gears and rotatably mounted on a support diametrically located with respect of said arms, said support anchored in one of said arms but free in the other arm, a sleeve embracing said housing and adapted to have a longitudinal movement thereon, a lever connected to said sleeve, engaging means on said sleeve and spring-arms so that, when said lever is actuated, the spring-arms are compressed by the sleeve to force the pinions into locking engagement with the gears and thus cause the driven shaft, housing and sleeve to rotate in unison with the driving-shaft, for the purpose set forth.

3. In a reversing device of the character described, the combination with a driving-shaft and a driven shaft bevel-gears carried thereby with elongated hubs, of a housing embracing said shafts and gears and journaled on said hubs, circularly-shaped spring-arms in the body of said housing, bevel-pinions registering with said gears and rotatably mounted on a support diametrically located in said arms, said support anchored in one of said arms but free in the other arm, a sleeve embracing said housing and adapted to have a longitudinal movement thereon, a brake-band embracing said housing, a reversing-lever located between said sleeve and brake-band, means for connecting said sleeve and brake-band thereto, means whereby said brake-band is engaged with and disengaged from said housing, engaging means on said spring-arms and sleeve so that, when said lever is actuated in one direction, the brake-band is released and the spring-arms are compressed by the sleeve to forcibly lock the pinions and gears together and thus cause the driven shaft, housing, sleeve, pinions and gears to rotate in unison with the driving-shaft, and when actuated in the opposite direction, the pinions are unlocked and the brake-band brought into gripping engagement with the housing to hold the same stationary while the propeller-shaft is reversely rotated, for the purpose set forth.

4. In a device of the character described, the combination with a driving-shaft and a driven shaft bevel-gears carried thereby, of a housing embracing said shafts and gears and journaled about the same, circular-shaped spring-arms in the body of said housing, bevel-pinions registering with said gears and rotatably mounted on a support diametrically located in said arms, said support anchored in one of said arms and free in the other, a sleeve embracing said housing and arms and having a longitudinal movement thereon, a lever connected to said sleeve, engaging means on said sleeve and arms whereby the latter is compressed by the former to bring the pinions into forcible engagement with the gears and thus lock them together so that, the driven shaft, housing, sleeve, pinions and gears will rotate in unison with the driving-shaft, for the purpose set forth.

5. In a device of the character described, the combination with a driving-shaft and a driven shaft bevel-gears carried thereby, interposed pinions connecting said gears, of a housing embracing said shafts, pinions and gears and journaled about the same, circular-shaped spring-arms formed from said housing, bevel-pinions registering with said gears and rotatably mounted on a support diametrically located in said arms, said support anchored in one of said arms and free in the other, a sleeve embracing said housing and arms and having a longitudinal movement thereon, a lever connected to said sleeve, engaging means on said sleeve and arms whereby the latter is compressed by the former to bring the pinions into forcible engagement with the gears and thus lock them together so that, the driven shaft, housing, sleeve, pinions and gears will be rotated in unison with the driving-shaft, means for removably engaging said lever with the brake-band to hold said lever against accidental movement, for the purpose set forth.

6. In a device of the character described, the combination with a driving-shaft and a driven shaft bevel-gears carried thereby, interposed pinions connecting said gears, of a housing embracing said shafts, pinions and gears and journaled about the same, spring-arms formed from a portion of said housing, a sleeve slidably mounted on said housing, means on said arms and sleeve adapted to be engaged to compress said arms, means against which said arms contact to lock the driving-shaft and driven shaft together for a straightaway movement, for the purpose set forth.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 16th day of September, A. D. 1904.

CHARLES F. KRAUT.

Witnesses:

ANDREW WOOD,

S. J. CHAFFEE.