

Nov. 29, 1938.

J. J. O'BRIEN ET AL

2,138,117

BELT TIGHTENER

Filed Nov. 27, 1935

2 Sheets-Sheet 1

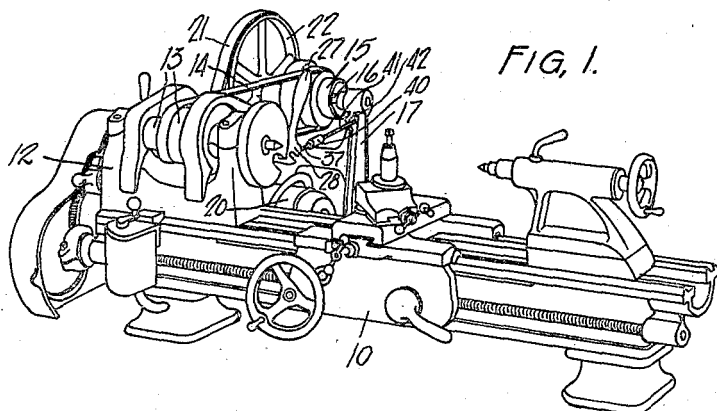


FIG. 1.

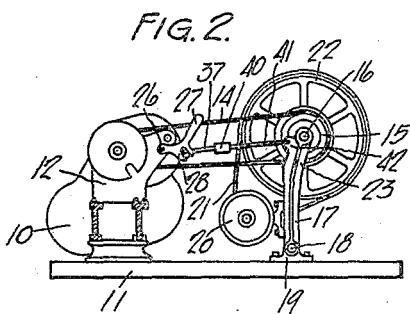


FIG. 2.

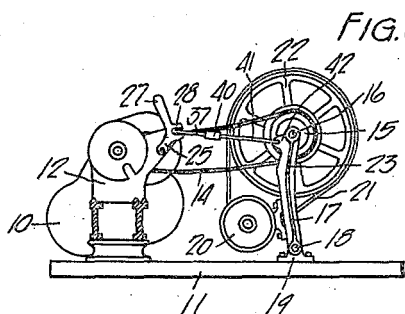


FIG. 3.

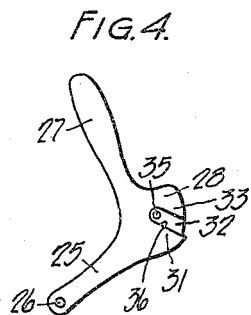


FIG. 4.

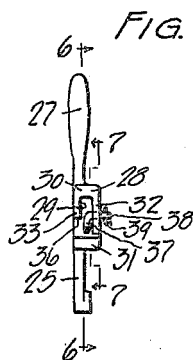


FIG. 5.

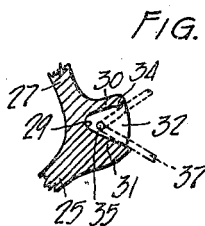


FIG. 6.

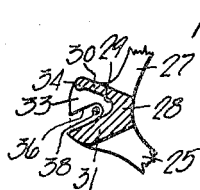


FIG. 7.

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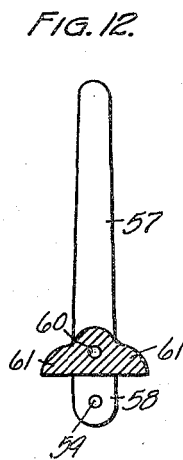
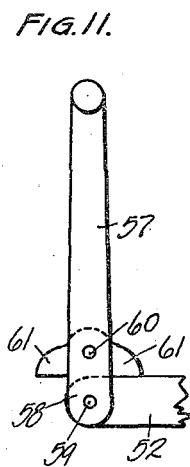
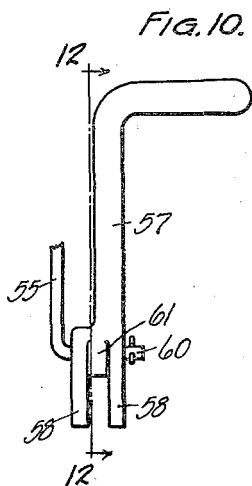
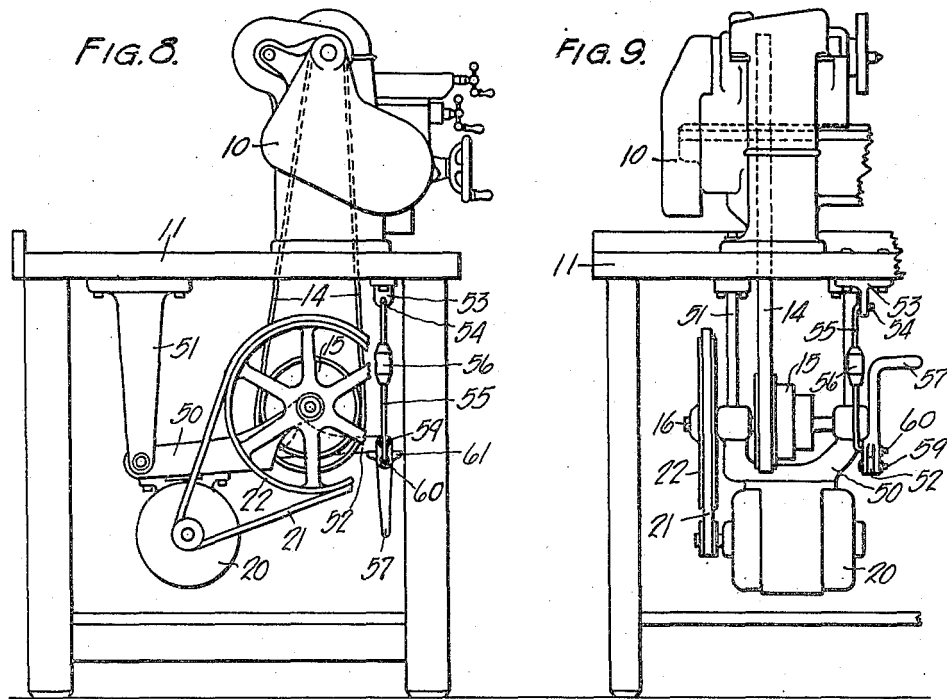
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BELT TIGHTENER

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,138,117

BELT TIGHTENER

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Application November 27, 1935, Serial No. 51,819

5 Claims. (Cl. 74—242.15)

This invention relates to belt tighteners, and more particularly to belt tighteners for lathes which are preferably provided with a horizontal drive belt actuated by an independently mounted countershaft assembly.

The primary object of the invention is to provide a simple device of this character by which a shiftable countershaft mechanism may be locked in either belt tensioning or belt releasing position.

A further object is to provide a device of this character constructed whereby the tension applied thereby to a drive belt may be accurately adjusted.

A further object is to provide a device of this character in the nature of a toggle provided with a stop to limit pivoting thereof in one direction at substantially dead center.

A further object is to provide a substantially upright pivoted countershaft mechanism shiftable by a foldable member either against the tension of a drive belt to substantially balanced position upon extension of said member, or oppositely to unbalanced position in the direction of a driven member whereby the weight of said countershaft mechanism assists in locking or maintaining said foldable member in folded position.

A further object is to provide a device of this character comprising pivotally interconnected parts, the pivot end of one of said parts having a jaw in which the other part is received to limit the degree of relative pivoting of said parts.

A further object is to provide a device for selectively applying or releasing tension of a drive belt comprised of pivotally interconnected parts, one of which affords a hand grip for operating the device and is provided with stop members which limit actuation thereof and assist in locking the device in either tension applying or tension releasing position.

A further object is to provide a device of this character which is simple in construction, readily assembled and applied, and comparatively inexpensive.

Other objects will be apparent from the description and the appended claims.

In the drawings:

Figure 1 is a perspective view of a lathe to which the improved belt tightener is applied.

Figure 2 is an intermediate transverse sectional view of a lathe which is driven by countershaft mechanism positioned in belt tensioning relation by the belt tightener.

Figure 3 is a view similar to Fig. 2, and illus-

trates the countershaft mechanism and belt tightener locked in tension releasing position.

Figure 4 is a side view of the handle or lever part of the belt tightener.

Figure 5 is a front view of the lever part of the belt tightener.

Figure 6 is a longitudinal sectional view of the lever part of the belt tightener taken on line 6—6 of Fig. 5.

Figure 7 is a longitudinal sectional view of the lever part of the belt tightener taken on line 7—7 of Fig. 5.

Figure 8 is a side view, with parts broken away, of a lathe driven by a modified form of countershaft mechanism locked in belt releasing position.

Figure 9 is a fragmentary view in front elevation, illustrating the modified construction in belt tensioning position.

Figure 10 is a side view of the operating or crank portion of the modified construction.

Figure 11 is a view of the crank portion in front elevation.

Figure 12 is a longitudinal sectional view of the crank portion taken on line 12—12 of Fig. 10.

Referring to the drawings, wherein the belt tightener is illustrated as applied to a lathe, and particularly to Figs. 1 to 7, the numeral 10 designates a small lathe adapted to be mounted on a bench or other support 11. Lathe 10 is provided with a headstock 12 including a cone driving pulley 13 around which a drive belt 14 runs. Belt 14 extends rearwardly from pulley 13 in substantially horizontal runs to a complementary cone pulley 15 mounted on a countershaft 16 journaled at the upper end of a frame 17. The lower end of frame 17 is pivoted at 18 to a mounting member 19 secured to bench 11 in rearwardly spaced relation to lathe 10. Intermediate its height the frame 17 mounts a drive motor 20 at the side thereof adjacent lathe 10, and this motor operates a belt 21 which runs over a pulley 22 mounted on countershaft 16. The upper end 23 of frame 17 extends angularly from the portion thereof mounting motor 20 in a direction opposite the side mounting the motor, as best illustrated in Fig. 2, and for purposes to be hereinafter set forth.

One end 25 of a hand lever is pivoted at 26 to the headstock 12 of the lathe adjacent pulley 13, said lever being bent intermediate its ends to provide a handle 27 extending angularly to the end 25 thereof. Integrally formed with said hand lever adjacent its center is an enlargement 28 projecting laterally from the obtuse side thereof.

Enlargement 28 is provided with a central longitudinal substantially V-shaped opening or mouth 29 intermediate its sides defined by diverging upper and lower jaws 30 and 31, respectively, and by side walls 32 and 33. The upper jaw 30 is provided with a bead 34 at the lower side of its outer end. Wall 32 is provided with a circular opening 35 extending therethrough into communication with mouth 29 adjacent the inner end or apex thereof and spaced from and intermediate jaws 30 and 31. Wall 33 is provided with an elongated slot 36 preferably extending parallel to and adjacent the upper face of lower jaw 31, said slot terminating opposite opening 35.

One end of a rod 37 extends into mouth 29, and is perpendicularly bent at 38 to pass through and be journaled in opening 35. A cotter pin 39 serves to hold said rod against withdrawal from operative connection with the lever enlargement. The opposite end of rod 37 is threaded to mount one end of a turnbuckle 40 whose opposite end is threaded on a complementary rod 41 pivoted to an ear 42 projecting from the upper end 23 of countershaft frame 17.

In assembling the belt tightener, the hand lever is pivotally mounted on the lathe headstock, and the rod and turnbuckle unit is pivotally mounted on the countershaft frame. The end 38 of rod 37 is then passed through slot 36 in wall 33 of the lever into the mouth 29 thereof and journaled in opening 35, whereby said rod is positioned between walls 32 and 33, which normally act to prevent the lever and rod unit from shifting to lateral disalignment, and between the jaws 30 and 31 which define the limits of relative pivotal movement of the lever and rod unit. Cotter pin 39 serves to form means for quickly and effectively locking said rod to said lever and to facilitate quick disconnection thereof.

The hand lever and the rod unit cooperate to form a foldable or toggle assembly which is readily operable by the projecting outer handle part 27 of said lever. By urging the hand lever rearwardly and downwardly relative to the lathe, the pivot connection 35 of the rod 37 therewith is lowered into alignment with the lever pivot 26 and the pivot of rod 41 on ear 42 of the countershaft frame, thus extending the assembly and pivoting countershaft frame 17 in a direction away from the lathe to tension the drive belt 14. The parts are so proportioned, adjusted and arranged that when the pivot center 35 reaches dead center the desired belt tension will be applied to the belt 14, and that when pivot center 35 has slightly passed said dead center position the rod 37 will be engaged by the bead 34 of the upper jaw 30 of the lever to lock the parts in said dead center belt-tensioning position. The bent or angular shape of frame 17 positions the weight of the upper end 23 thereof, of countershaft 16 and of pulleys 15 and 22 to the side of the vertical plane of the pivot axis 18 of frame 17 opposite that on which motor 20 is mounted to substantially counterbalance the weight of said motor as the countershaft assembly approaches belt-tensioning position, and thereby facilitate shifting of the countershaft assembly by the handle 27 of the hand lever which affords comparatively small leverage. The parts are so arranged, however, that slight shifting of the countershaft assembly from belt-tensioning position and toward the lathe throws the center of gravity of the assembly to the side of the vertical plane of the pivot 18 toward the lathe. Thus upward and forward shifting of the hand lever 25, 27 relative

to the lathe is easily accomplished, and the subsequent unbalanced weight of the countershaft assists in folding of the belt tightening assembly and raising the pivot center 35 to the point at which lower jaw 31 of the lever is engaged by rod 37, to prevent further folding and to lock the counterbalance mechanism in belt releasing position. It will therefore be seen that this belt tightener can be quickly and simply operated, by pivoting the hand lever, to facilitate quick change of the position of the belt 14 on the cone pulleys, and that the lever and tightening assembly, by the relation and proportioning of parts, is automatically locked in each of its extremes of movement by the mere reaching of such extremes of movement and without the necessity of using separate locking means.

The provision of the turnbuckle 40 affords simple means in the tightening assembly for accurately adjusting the tension applied to the belt when desired, without in any way effecting the normal operation of the tightener by the hand lever, and without need for operation thereof in the normal belt tightening and releasing movements of the device.

A modified form of the device is illustrated in Figs. 8 to 12, and is adapted particularly for driving the lathe by a motor drive unit beneath the bench on which the lathe is mounted. In this form, the lathe 10 is mounted on a bench 11 provided with suitable openings through which the drive belt 14 may extend from the lathe headstock to the driving step pulley 15. The pulley 15 is mounted on a shaft 16 which is journaled at one end of a substantially horizontal frame 50 whose opposite end is pivotally connected to a rigid depending bracket 51 secured to the under side of the bench 11. Motor 20 is secured to the under side of frame 50 and drives pulley 22 on shaft 16 by means of belt 21. Frame 50 is provided with a longitudinal extension 52 projecting from the end thereof which journals shaft 16.

Mounted on the under side of bench 11 in spaced relation to bracket 51 is a bracket 53 to which is pivoted at 54 a depending rod assembly 55 provided with a turnbuckle 56. The lower end of rod assembly 55 is pivotally connected to a crank 57 in spaced relation to the end thereof. Crank 57 is bifurcated at its pivoted end 58 to receive the end of extension 52 to which it is pivoted at 59 in spaced relation to the pivot connection 60 of rod 54 and the crank. Ears 61 project from opposite sides of the crank, the lower surfaces of said ears forming continuations of the bottom or inner face of the kerf between the forked crank arms 58.

In operation, the crank 57 is adapted to pivot relative to rod 55 in an arc slightly exceeding 180 degrees. When the crank is in the lowermost position illustrated in Fig. 8, the pivot 59 is slightly disaligned from the pivots 54 and 60, so that one of the ears 61 underlies and bears against the lower face of extension 52 of the driving pulley frame 50 which has been raised by said crank. In this position the ear 61, coupled with the overcenter relation of parts and the weight of the motor drive assembly supported by the crank and rod assembly, serves to lock the motor drive assembly in elevated belt releasing position. Rotation of crank 57 to its opposite extreme of movement depresses the frame 50 against the tension of the belt 14, the engagement of the other ear 61 with the upper surface of the extension 52, coupled with the belt ten-

sion and the overcenter of pivot 59 relative to pivots 54 and 60 serving to lock the parts in this belt tensioning position. Thus the parts in this modified construction serve in the same relation as in the preferred form, even though applied to an underneath vertical drive instead of a horizontal drive. The jaws and ears of the operating lever and crank in both constructions cooperate with the rod assembly in the same manner and effect the locking of parts in both tensioning and releasing positions by the same modus operandi.

We claim:—

1. The combination with a stationary member, a shiftable member, a pulley carried by each member, a drive belt connecting said pulleys, of a belt tightener comprising a lever pivoted to said stationary member, an elongated member pivoted at one end to said shiftable member and at its opposite end to said lever in spaced relation to the lever pivot, and a pair of diverging jaws projecting from said lever to define a mouth into which said elongated member extends, said jaws engaging said elongated member to lock said tightener at predetermined opposed limits of pivotal movement.

2. The combination with a fixed member, a shiftable member, a pulley carried by each member, a drive belt connecting said pulleys, of a belt tightener comprising a lever pivoted at one end to said fixed member, an elongated member pivoted at its ends to said shiftable member and to said lever intermediate the lever ends, said lever having an enlargement provided with an opening into which said elongated member extends, the walls of said enlargement defining said opening engaging said elongated member at predetermined limits of relative pivotal movement of said lever and elongated member to lock said shiftable member in driving and released relation to said driven member.

3. A belt tightener for shifting a drive member mounting a pulley relative to a driven member mounting a pulley connected to said first pulley by a belt, comprising a lever adapted to be pivoted to said driven member, a hollow open ended projection carried by said lever intermediate its ends in spaced relation to its pivot, and an elongated member adapted to be pivoted at one end to said drive member and extending within and pivoted to said hollow projection at its other end, the opposed walls of said housing serving to respectively guide and limit relative pivoting of said lever and elongated member.

4. A belt tightener for shifting a drive member mounting a pulley relative to a driven member mounting a pulley connected to said first pulley by a belt, comprising a lever pivoted to said driven member, a pair of diverging jaws projecting from said lever, spaced webs connecting said jaws, one web having an opening therein, the other web having a slot terminating opposite said opening, and an elongated member pivoted at one end to said drive member and extending between said jaws and webs and terminating in a bent portion journaled in said opening at its other end, said slot accommodating insertion of said elongated member between said jaws and webs.

5. A belt tightener for shifting a pulley carrying drive member relative to a belt connected pulley carrying driven member, comprising a lever pivoted to said driven member, diverging jaws projecting from said lever, a wall connecting said jaws at one side thereof and having an opening therethrough, and an elongated member pivoted to said drive member and provided with a bent end journaled in said opening, said elongated member extending between said jaws.

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