J. M. FEENEY.

ADJUSTABLE CRANK.

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1,427,798.

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Fig. 1

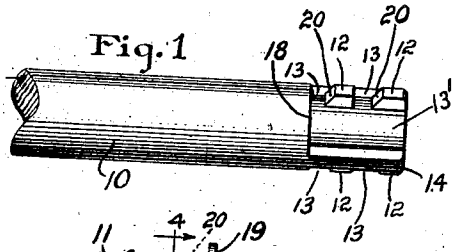


Fig. 2

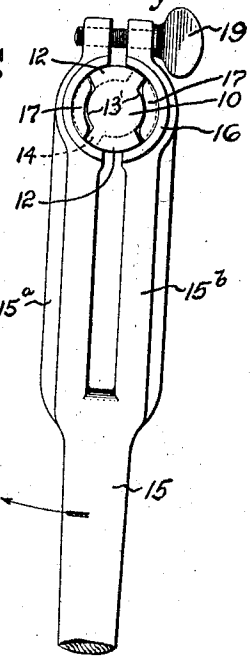


Fig. 3

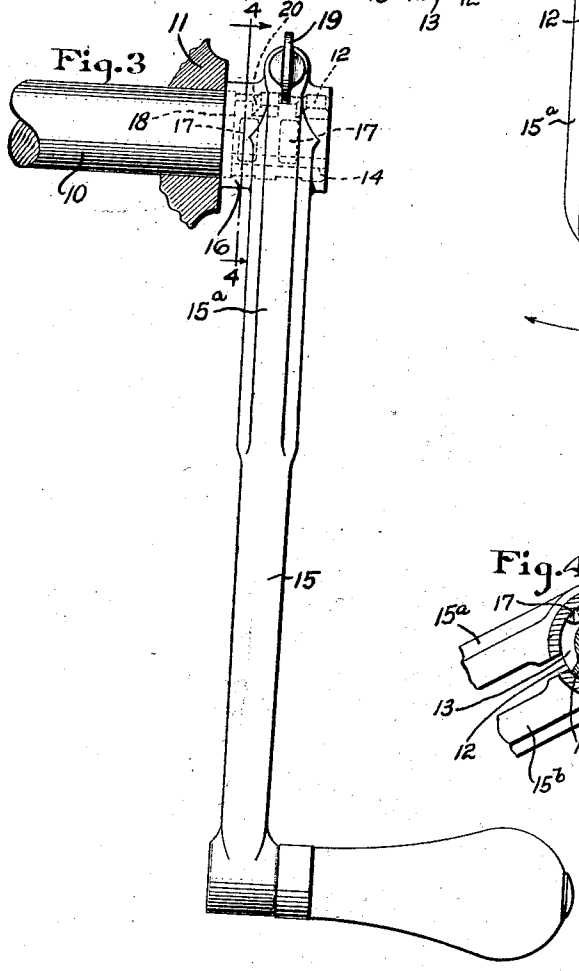
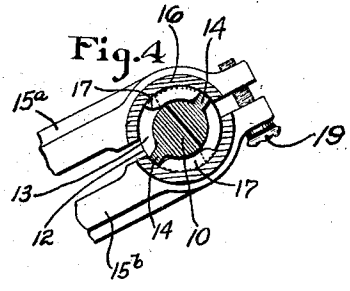


Fig. 4



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UNITED STATES PATENT OFFICE.

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ADJUSTABLE CRANK.

Application filed April 25, 1921. Serial No. 464,271.

To all whom it may concern:

Be it known that, I, JOHN M. FEENEY, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Adjustable Cranks, of which the following is a specification.

This invention relates to means for attaching handles to shafts, and especially, although not exclusively, to means for attaching a crank handle to the combined operating shaft and feed screw of a food chopper or the like wherein it is frequently necessary to detach the handle in order to remove the feed screws for cleaning or other purposes, and wherein it is desirable that means be provided for tightening the handle longitudinally of the shaft in order that the cutter carried by the latter may be held in close engagement with its cooperating fixed cutter.

The invention has for its primary object to provide a quick detachable crank handle for machines of the character referred to and others, said handle having means whereby its longitudinal position on the shaft may be readily adjusted, the adjustment having once been made being unaffected by the removal or replacement of the handle, and the adjusting means being of such character as in no way to interfere with the latter operation.

With the foregoing and other objects in view I have devised the novel crank handle connection which I will now describe, reference being had to the accompanying drawings, wherein:

Fig. 1 is a side elevation of the end of the shaft with the crank handle detached.

Fig. 2 is an end elevation and Fig. 3 a side elevation of the crank and shaft, showing the parts in the relative positions occupied after the first movement involved in attaching the crank to the shaft.

Fig. 4 is a section on the line 4—4, Fig. 3, showing the crank and shaft fully connected.

10 denotes a shaft journalled in a bearing 11, and 15 a crank handle adapted for attachment to the end of the shaft 10. The crank handle 15 is provided with a hub 16 which is attached to the end of the shaft 10 by means of a form of bayonet joint comprising a suitable number (herein four) of circumferentially disposed ribs or lugs 12 formed on said shaft and spaced from each other, and from a shoulder 18 on the shaft adjacent the outer face of the bearing 11, to receive a corresponding number of coacting circumferential ribs or lugs 17 formed on the interior of the hub 16. The lugs or ribs 12 are spaced longitudinally of the shaft to provide circumferential grooves 13 through which the ribs or lugs 17 may be passed circumferentially of the shaft, said last named ribs or lugs being similarly longitudinally spaced to permit the passage of the lugs 12 when the parts are so moved. The lugs 12 are also spaced from each other circumferentially of the shaft and from longitudinal ribs 14 to provide longitudinal grooves 13′. To apply the crank handle 15 to the shaft, said crank handle is placed in an angular position with respect to the shaft in which the lugs 17 register with the grooves 13′, as shown in Fig. 2, is then moved longitudinally of the shaft to bring the lugs 17 opposite the spaces 13 between the lugs 12 and between the innermost of said lugs and the shoulder 18, as shown in Fig. 3, and is then given an angular movement in the direction in which said crank handle is intended to turn the shaft to carry said lugs 17 into said spaces, as shown in Fig. 4, said angular movement being limited by engagement of the lugs 17 with the longitudinal ribs 14 on the shaft adjacent the grooves 13, thereby providing a positive driving connection between said crank handle and shaft.

The inner end of the crank handle 15, including the hub 16, is split to form two arms 15^a and 15^b connected beyond said hub by a clamp screw 19 which may be operated to move the sections of said hub, and the lugs 17 which are carried thereby respectively, radially of the shaft. The lugs 12 are formed with inner faces 20 which are inclined longitudinally of the shaft, said faces constituting cam surfaces which are engaged by the lugs 17 on the crank handle when the latter is in operative position on the shaft. The lugs 12 and 17 are so designed and positioned as to permit a certain amount of longitudinal lost motion between the handle and shaft when the clamp screw 19 is loosened, and when said clamp screw is tightened to move the lugs 17 inwardly in a radial direction upon the shaft, engagement of said lugs 17 with the cam surfaces 20 will cause the crank handle to be forced longitudinally of the shaft in the direction of the bearing 11, thereby causing the inner side of the hub 16 to engage said bearing with any desired

degree of tightness, and producing an outward pull upon the shaft in order to force the cutter or other part carried thereby into the desired position.

In operation, the clamp screw 19 is loosened and the crank handle applied to the shaft by successive longitudinal and angular movements as above explained, whereupon said clamp screw is tightened to such an extent as may be found necessary in order to produce the desired tightness of the parts. Thereafter, when it becomes necessary for any reason to remove the handle, this may be quickly done by reversing the above described operations by which said handle is attached, the setting of the clamp screw 19 being left undisturbed, so that when said handle is again attached it will automatically assume the adjusted position previously determined.

It will thus be seen that means are provided whereby the handle may be easily and quickly attached and detached when desired, and whereby the desired tightening adjustment can be easily effected, said adjustment, when once having been made, being in no way disturbed by the subsequent removal and replacement of the handle, so as to require no subsequent attention other than that which may be necessitated by wear or other change in conditions. It will also be noted that the tightening adjustment is independent of the angular movement of the handle, which is otherwise in positive driving engagement with the shaft, said tightening adjustment being effected solely by operation of the clamp screw 19, and being limited by the extent of operation of the latter, so that subsequent operation of the handle does not in any way tend to increase the tightness of the parts.

Having thus described my invention, I claim:

1. The combination with a shaft and a handle for turning said shaft, of cooperating means on said handle and shaft and engaged by relative movement of said shaft and handle for attaching said handle to said shaft and for tightening said handle longitudinally of said shaft, said means being operated in one direction to effect the tightening of said handle and in a different direction to complete the attachment of said handle to said shaft.

2. The combination with a shaft and a handle for turning said shaft, of cooperating means on said handle and shaft and engaged by relative movements of said shaft and handle for attaching said handle to said shaft, said means being adjustable to tighten said handle longitudinally of said shaft, and the adjustment being unaffected by relative movement of said handle and shaft to attach and detach said handle.

3. The combination with a shaft and a handle for turning said shaft, of cooperating means on said handle and shaft and engaged by relative movement of said shaft and handle for attaching said handle to said shaft for providing a positive driving connection therebetween, said means having a portion adjustable to tighten said handle longitudinally of said shaft independently of said driving connection.

4. The combination with a shaft having a retaining projection, of a handle on said shaft having a projection cooperating with the projection on said shaft to retain said handle on said shaft and engageable therewith by relative movement of said shaft and handle in one direction, one of said projections being movable in another direction and one having a cam surface engageable with the other of said projections to cause a tightening of said handle longitudinally of said shaft.

5. The combination with a shaft having a retaining projection, of a handle having a projection cooperating with the projection on said shaft to retain said handle on said shaft, said projections being engaged by relative angular movement of said shaft and handle, one of said projections having a cam surface and one being movable radially of said shaft to cause engagement of said cam surface with the other of said projections to move said handle longitudinally of said shaft.

6. The combination with a shaft having a retaining projection, of a handle having a split hub provided with an interior projection to engage the projection on said shaft and retain said handle on said shaft, one of said projections having a cam surface, and a clamp screw for contracting said hub about said shaft, engagement of said cam surface with the other of said projections causing longitudinal movement of said handle on said shaft.

7. The combination with a shaft having a circumferentially disposed rib formed with a longitudinally inclined inner face, of a handle having a circumferentially disposed rib cooperating with the rib on said shaft to retain said handle on said shaft, the rib on said handle being radially movable to engage the inclined inner face of the rib on said shaft and move said handle longitudinally of said shaft.

8. The combination with a shaft having a retaining projection, of a handle having a projection cooperating with the projection on said shaft to retain said handle on said shaft, said projections being engaged by relative angular movement of said shaft and handle, one of said projections having a cam surface and the projection on said handle being movable radially of said shaft to cause engagement of said cam surface with the other of said projections and move said

handle longitudinally of said shaft, and means for limiting the relative angular movement of said shaft and handle to provide a positive driving connection therebetween.

9. The combination with a shaft having a circumferentially disposed rib formed with a longitudinally inclined inner face and a longitudinally disposed rib, of a handle having a circumferentially disposed rib cooperating with the circumferentially disposed rib on said shaft to retain said handle on said shaft and with said longitudinally disposed rib to provide a positive driving connection between said handle and shaft, the rib on said handle being radially movable to engage the inclined inner face of the circumferentially disposed rib on said shaft and move said handle longitudinally of said shaft.

10. The combination with a shaft having a circumferentially disposed rib formed with a longitudinally inclined inner face, of a handle having a split hub provided with an interior circumferentially disposed rib cooperating with the rib on said shaft to retain said handle on said shaft, and a clamp screw for contracting said hub about said shaft, engagement of the rib on said hub with the inclined inner face of the rib on said shaft causing longitudinal movement of said handle on said shaft.

11. The combination with a shaft having a circumferentially disposed rib formed with a longitudinally inclined inner face and a longitudinally disposed rib, of a handle having a split hub provided with an interior circumferentially disposed rib cooperating with the circumferentially disposed rib on said shaft to retain said handle on said shaft and with said longitudinally disposed rib to provide a positive driving connection between said handle and shaft, and a clamp screw for contracting said hub about said shaft, engagement of the rib on said hub with the inclined inner face of the rib on said shaft causing longitudinal movement of said handle on said shaft.

12. The combination with a shaft having a retaining projection and a bearing in which said shaft is journalled, of a handle on said shaft adjacent said bearing and having a projection cooperating with the projection on said shaft to retain said handle on said shaft, one of said projections having a cam surface engagement of which with the other of said projection causes said handle to be forced into engagement with said bearing with a limited adjustable pressure.

13. The combination with a shaft having a retaining projection and a bearing in which said shaft is journalled, of a handle on said shaft adjacent said bearing and having a projection cooperating with the projection on said shaft to retain said handle on said shaft, said projections being engaged by relative angular movement of said shaft and handle, one of said projections having a cam surface and one being movable radially of said shaft to cause engagement of said cam surface with the other of said projections to move said handle against said bearing.

14. The combination with a shaft having a retaining projection and a bearing in which said shaft is journalled, of a handle on said shaft adjacent said bearing and having a projection cooperating with the projection on said shaft to retain said handle on said shaft, said projections being engaged by relative angular movement of said shaft and handle, one of said projections having a cam surface and one being movable radially of said shaft to cause engagement of said cam surface with the other of said projections to move said handle against said bearing, and a projection on said shaft engaged by the projection on said handle to limit the relative angular movement of said shaft and handle and provide a positive driving connection therebetween.

15. The combination of a shaft and a handle for turning the shaft, of cooperating means on said handle and shaft and engageable by relative longitudinal and circumferential movements of the handle and shaft to attach the handle to the shaft, and means for adjusting the position of the handle longitudinally of the shaft.

In testimony whereof I affix my signature.

JOHN M. FEENEY.