Nov. 10, 1936. L. C. PACKER 2,060,523

BEATER ROD LOCKING DEVICE

Filed March 29, 1934

Fig. 1.

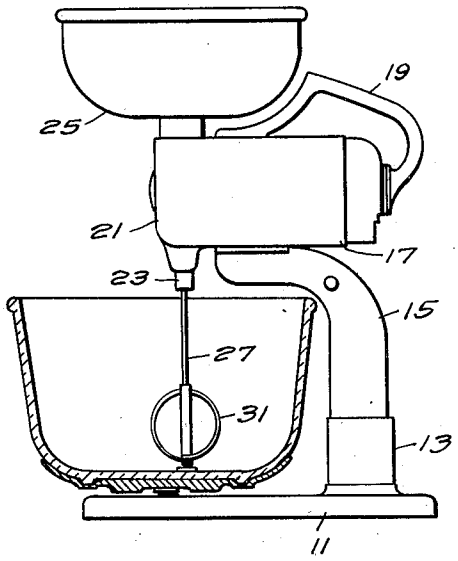


Fig. 2.

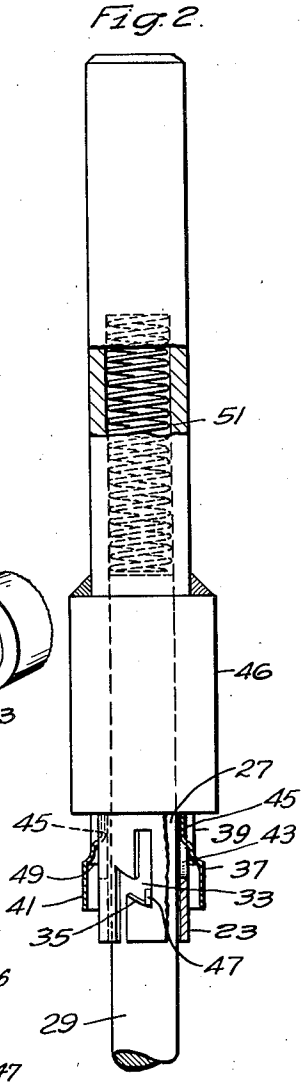


Fig. 4.

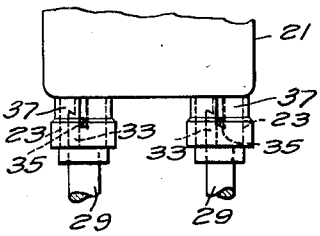


Fig. 3.

Fig. 5.

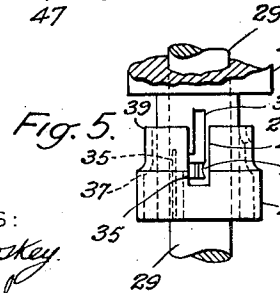
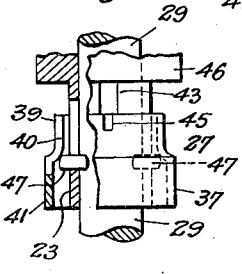


Fig. 6.



WITNESSES:

E. A. McCloskey.

J. M. Bielel

INVENTOR

Lewis C. Packer.

BY

M. R. Coley

ATTORNEY

Patented Nov. 10, 1936

2,060,523

UNITED STATES PATENT OFFICE

2,060,523

BEATER ROD LOCKING DEVICE

Lewis C. Packer, Longmeadow, Mass., assignor to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application March 29, 1934, Serial No. 717,970

6 Claims. (Cl. 287—103)

My invention relates to kitchen appliances and more particularly to motor-driven mixers, and the like.

An object of my invention is to provide a relatively simple means for locking a beater rod in proper operative position relative to a drive shaft.

Another object of my invention is to provide a relatively simple and efficient beater-rod locking means that shall permit an operator to quickly assemble and disassemble the beater rod with respect to a drive shaft.

Other objects will either be apparent from the following description of a preferred embodiment of my invention, or will be pointed out hereinafter.

In practicing my invention, I provide a hollow drive shaft, which may extend vertically, into which is adapted to fit the upper end of a beater rod having at least one radial lug near its upper end. This lug is adapted to fit into a slot in the wall of the lower end of the hollow drive shaft, and particularly to fit against a shoulder of the slot. A sleeve or collar having one portion of an internal diameter but slightly larger than the external diameter of the drive shaft, and having a second portion of an appreciably larger internal diameter than the external diameter of the drive shaft, cooperates with the lug on the beater rod to hold the same in proper operative position, there being a spring in the hollow drive shaft yieldingly pressing the beater rod downwardly to hold the lug against the shoulder.

In the accompanying single sheet of drawings:

Figure 1 is a view, mainly in side elevation but partly in section, of a motor driven kitchen beater or mixer embodying my invention,

Fig. 2 is a view, mainly in front elevation, with a part shown in section, of the drive shaft and beater rod of the structure shown in Fig. 1, one of the parts being shown in an initial position;

Fig. 3 is an exploded perspective view showing the three main elements embodying my invention;

Fig. 4 is a fragmentary view in front elevation of part of the elements shown in the other figures;

Fig. 5 is a view in front elevation of the locking means shown in the locking position, and

Fig. 6 is a view partially in elevation and partially in section, of the parts shown in Fig. 5, as seen from the right-hand side thereof.

The elements particularly embodying my invention have been developed in connection with a motor-driven kitchen appliance, and I have, therefore, shown such a device in Fig. 1 of the drawing. The device includes a base 11, a vertical standard 13 thereon, and a curved arm 15, the lower end of which fits in the standard 13 and may turn relatively thereto. The arm 15 may be of substantially inverted L-shape and have secured to the horizontally extending part a motor assembly 17, which is removable from the arm 15 and may be held by a handle 19.

The motor assembly includes a forward or front gear box 21 having depending therefrom a pair of rotatable hollow drive shafts 23. As the means for actuating the rotatable shafts 23 from the motor constitute no part of my present invention, these means are not shown in detail, and any suitable mechanism may be employed. The kitchen appliance includes also a juice extractor indicated generally by the juice-receiving bowl 25.

A pair of beaters 27, only one of which is shown in Fig. 1 of the drawing, is operated through the drive shafts 23, and each of these beaters includes a beater rod 29. Beater elements may be in the form of a plurality of arcuate bars 31.

The lower end of each of the hollow drive shafts 23 is provided with a slot 33 which extends substantially axially of the drive shaft 23, and which may be described as of substantially Z-shape or as including two peripherally-offset portions. The shape of the slot is shown in Figs. 2, 3 and 4 of the drawing, from which it will be noted that one portion of the slot 33 extends to the lower end of a drive shaft 23, and that the construction is such as to provide an acute-angle shoulder portion 35 for a purpose to be hereinafter described. While I may use only one such slot, I now prefer to provide two such slots in each hollow shaft 23, spaced substantially diametrally of the shaft.

I provide also a sleeve or collar 37 which is adapted to be located on and surround the lower end of the drive shaft 23 being held there by gravity in the normal position of the device. The collar 37 includes an upper portion 39, whose internal diameter is but slightly larger than the external diameter of hollow shaft 23, and a lower portion 41, whose internal diameter is appreciably larger than the external diameter of drive shaft 23. In order to retain the sleeve or collar 37 on the cooperating hollow drive shaft 23, the drive shaft is provided with one or two slots or grooves 43 therein which may be spaced from the slots 33 and may be located midway therebetween. The sleeve 37 is provided with indented portions 45, which are adapted to fit into the slots or grooves 43 after the sleeve has been slipped over the drive shaft 23. This permits the sleeve 37 to move axially through a predetermined distance on shaft 23,

but prevents any turning movement of the sleeve on its shaft 23. A collar 46 is fixedly secured to the hollow shaft 23 and may be used to limit the upward movement of sleeve 37 as well as to provide a bearing sleeve for the hollow rotatable shaft. The sleeve 37 is further provided with a pair of axial slots 40 in the portion 39 thereof and the location of the indented portions 45 is such that when the indented portions 45 are located in the slots 43, the slots 40 in the sleeve 37 register with the upper part of the slots 33 in the hollow drive shaft 23, substantially as shown in Fig. 5 of the drawing.

The beater rods 27 are each provided with one or more radially extending lugs 47 which may either be inserted into the beater rod 27 near the upper end thereof, or may be stamped by a suitable punch and die from the body of the beater rod.

When it is desired to operatively associate the beater rod with its drive shaft 23, the operator will grasp a beater rod and insert the upper end in the hollow shaft 23 in such position peripherally thereof that a lug 47 will enter the outer end of a slot 33. The lug 47 is of sufficient radial extent to project slightly beyond the thickness of the wall of the hollow shaft 23 and the internal diameter of portion 41 of sleeve 37 is such that the lug 47 will move freely within it. However, as the operator pushes upwardly, the lug or lugs 47 will engage the shoulder 49 (see Fig. 3 of the drawing), thereby pushing the sleeve 37 upwardly until by the proper turning movement of the beater rod 27, the lug 47 is moved into the other part of the slot 33. In the meantime, the upper end of the beater rod has come into engagement with a compression spring 51, which is located in the upper end of the hollow shaft 23, and if the operator now releases the beater rod 27, the spring 51 will push the lug 47 into the position shown in Figs. 2 and 4 of the drawing, that is, against the shoulder 35, thereby locking the beater rod in its proper operative position relatively to the hollow shaft 23. The relation of the indented portions 45 of sleeve 37 and the grooves 43 and hollow shaft 23 are preferably such that the downward movement of sleeve 37 on shaft 23 is limited to a predetermined amount, although the lug 47 or a plurality of such lugs may engage shoulder 49 in sleeve 37 and also support the sleeve 37. As the lugs 47 are of greater radial length than the radial thickness of the wall of the hollow shaft 23, the beater rod is effectively prevented from such an amount of peripheral movement as might release it from the shoulder 35. If the hollow drive shaft 23 is rotated in a counter-clockwise direction, as seen from the top thereof, the action of the material being beaten upon the beater rods will cause them to tend to lag behind the drive shaft and to take the position shown in Fig. 5 where the lug 47 is located against the trailing wall of the slot 40. Since the sleeve 37 is prevented from relative turning movement on the hollow drive shaft by the interfitting tongue and groove portions 45 and 43, the beater shafts will also be prevented from turning movement to such an extent as would aline the lugs 47 with the lower portions of the slots 33, of Z-shape, where they would be forced axially downwardly by the action of the spring 51, thereby unlocking the coupling.

The lugs 47 can be moved upwardly out of the position shown in Fig. 2 of the drawing as by engagement with the bottom of a thicker bowl or when the lower end of one or more of the beater rods frictionally engage the inner surface of the bowl to cause turning movement thereof.

In order to remove the beater rod from its cooperating drive shaft, it is only necessary for the operator to slightly raise sleeve 37 on shaft 23, whereby lug 47 will be located in the lower portion of sleeve 37, whereby beater rod 27 can be turned slightly in the opposite direction to remove the lug from its engagement with the shoulder 35, the lug 47 then being in the other portion of the slot 33 (which extends to the end of shaft 23), after which the beater rod can be moved downwardly for full release from the drive shaft.

The device embodying my invention thus provides a relatively simple, inexpensive and easily operated means for locking a beater rod to its cooperating drive shaft.

Various modifications may be made in the device embodying my invention without departing from the spirit and scope thereof, and I desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art or are set forth in the appended claims.

I claim as my invention:

1. In a beater assembly, a hollow drive shaft having a slot of Z-shape extending substantially axially of the wall at one end thereof, a sleeve on the shaft having an inner end portion movable axially only thereon and having an outer end portion of enlarged inner diameter, a beater shaft, having a radial lug thereon, adapted to fit into the hollow drive shaft with the lug extending into the slot of Z-shape and radially beyond the same and held therein against rotary movement by the inner end portion of the sleeve.

2. In a beater assembly, a hollow drive shaft having a slot of Z-shape in its wall at one end thereof and having also an axial groove in its outer surface peripherally spaced from the slot, a sleeve on the hollow shaft having one end portion of only slightly larger inner diameter than the hollow shaft and having a part of said end portion bent inwardly to extend into and move in the groove, the other end portion having a greater internal diameter, a beater shaft having a radial lug on its surface near one end thereof, adapted to fit into the hollow drive shaft with the lug extending into the slot of Z-shape, and a spring in the hollow drive shaft engaging the inserted end of the beater shaft to cause the lug thereon to interfit with a notch in the slot of Z-shape, said one end portion of the sleeve being adapted to engage a radial lug on the beater shaft to prevent a turning movement of the beater shaft to a position where it would be forced out of the hollow drive shaft by the spring.

3. In a beater assembly, a depending hollow drive shaft having a slot of substantially Z-shape in its wall at the lower end thereof, a sleeve on the shaft having an upper portion of an internal diameter only slightly greater than the external diameter of the drive shaft and a lower portion of an internal diameter appreciably greater than the external diameter of the drive shaft, interfitting means on the sleeve and drive shaft to hold the sleeve on the drive shaft, to prevent relative rotary movement and to permit limited relative axial movement thereof, a beater shaft adapted to extend into the hollow drive shaft, and a radial lug on the beater shaft adapted to pass into the lower end of the sleeve and fit in the slot of Z-shape, the upper portion of the sleeve cooperating with the radial lug on the beater shaft to prevent turning and axial outward movement

of the beater shaft relatively to the hollow drive shaft.

4. In a beater assembly, a drive shaft having a hollow lower end, an axial slot at the lower end having two connected peripherally-offset portions, a beater shaft adapted to fit into the hollow end of the drive shaft, a radial lug on the beater shaft adapted to be located in the slot against the intermediate shouldered portion of the slot wall, a spring in the hollow part of the drive shaft pressing the lug on the beater shaft against the shouldered portion of the slot wall and an axially movable sleeve on the drive shaft apertured to co-act with said lug in preventing rotary movement of said shaft and held by gravity in a position to prevent removal thereof.

5. In a beater assembly, a drive shaft having a hollow lower end and an axial slot in the wall extending to the lower end and having two connected peripherally-offset portions, a beater shaft having its upper end adapted to fit in the hollow lower end of the drive shaft, a radial lug on the beater shaft near its upper end and adapted to fit in the upper portion of the slot in the drive shaft wall and an axially movable sleeve on the drive shaft slotted to interlock with said lug to prevent turning movement of the sleeve on the drive shaft and held by gravity in a position where a part of the sleeve is alined axially with the upper portion of the slot in the drive shaft to prevent removal of the beater shaft.

6. In a beater assembly, a hollow drive shaft having an axial slot in the wall extending to the lower end of the shaft, said slot having two connected peripherally-offset portions, a beater shaft adapted to extend into the hollow shaft, a radial lug on the beater shaft adapted to be located in the upper portion of the slot in the drive shaft, a sleeve on the drive shaft at its lower end having two different internal diameters, the bottom portion of the sleeve having the larger internal diameter, and cooperating interfitting means on the hollow drive shaft and at the upper end of the sleeve to prevent relative turning movement thereof and to allow limited axial movement of the sleeve on the hollow drive shaft, the top portion of the sleeve cooperating with the lug on the beater shaft to prevent turning and an axial outward movement of the beater shaft relatively to the hollow drive shaft.

LEWIS C. PACKER.