March 14, 1961 C. L. SMADER 2,974,935

EJECTOR FOR DISCONNECTING TOOL SHAFTS FROM MOTOR DRIVEN POWER UNIT

Filed March 20, 1959 2 Sheets-Sheet 1

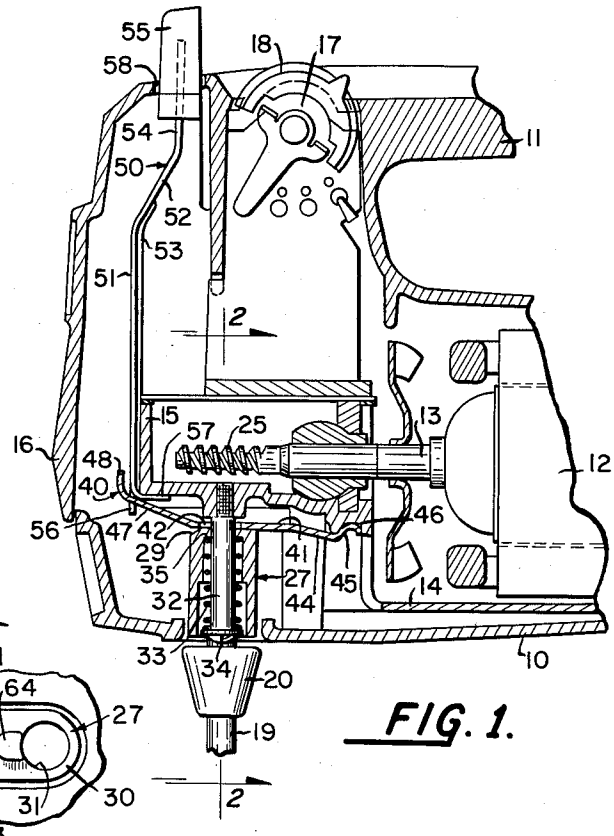


FIG. 1.

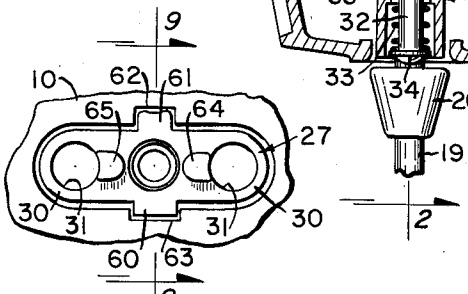


FIG. 8.

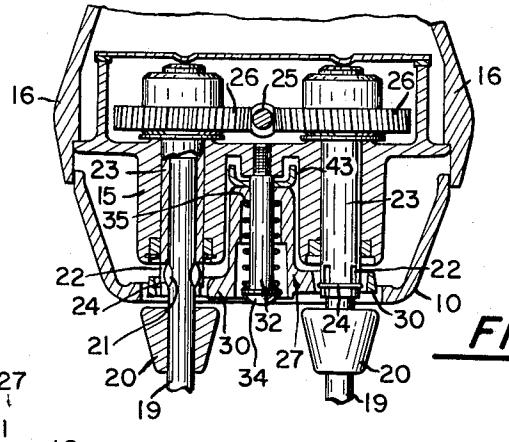


FIG. 2.

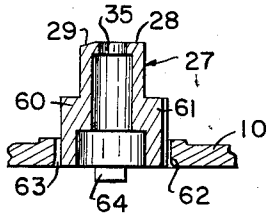


FIG. 9.

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EJECTOR FOR DISCONNECTING TOOL SHAFTS FROM MOTOR DRIVEN POWER UNIT

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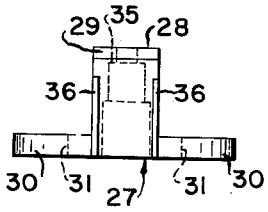


FIG. 7.

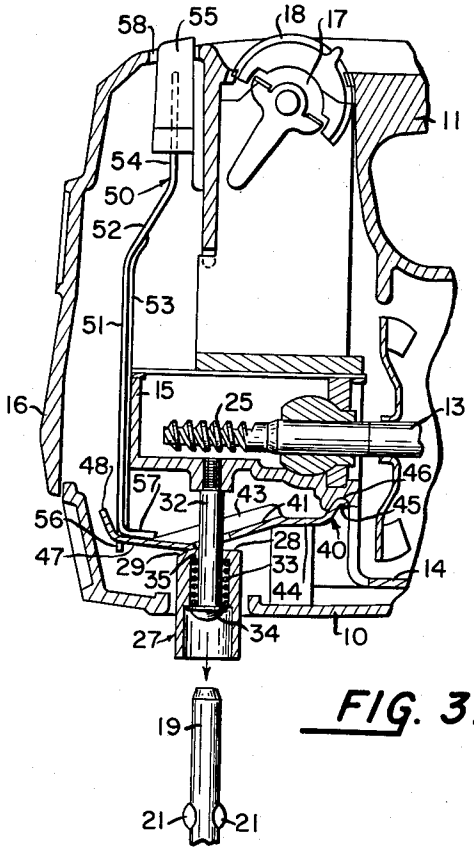


FIG. 3.

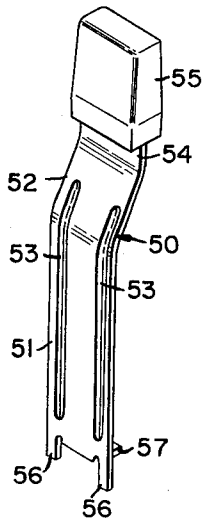


FIG. 4.

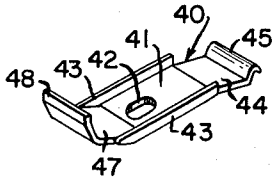


FIG. 5.

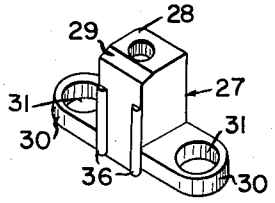


FIG. 6.

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United States Patent Office 2,974,935
Patented Mar. 14, 1961

2,974,935

EJECTOR FOR DISCONNECTING TOOL SHAFTS FROM MOTOR DRIVEN POWER UNIT

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Filed Mar. 20, 1959, Ser. No. 800,764
3 Claims. (Cl. 259—1)

This invention relates to ejector mechanism for disconnecting tool shafts from motor driven power units, and more particularly to ejector means for disconnecting and removing the beater shafts from the power units of motor driven food mixers without requiring the operator to touch the beater shafts or beater elements thereon.

Food mixers usually comprise an encased motor, attached gear unit and beater shafts rotatably mounted in the gear unit. To remove the beater shafts and beaters from the mixer for cleansing purposes without handling the beater shafts, I have provided improved ejector mechanism mounted in the gear unit of the mixer by which the beater shafts can be disconnected and ejected from the drive spindles quickly and easily.

One of the objects of the invention is to provide ejector mechanism for the purpose described which is manually actuated by a knob depressibly mounted in the top wall of the gear unit adjacent the forward portion of the handle, for easy depression by the thumb of the operator while holding the mixer by the handle. The knob is rigidly connected to a push bar which bears on an ejector lever pivotally mounted to exert downward pressure on an ejector member when the knob is depressed. The form and construction of the ejector mechanism are such that the several parts are interfitting and can be operatively assembled in the gear unit into a simple efficient arrangement without any fastening means other than a single bolt which passes through the ejector member body and yieldingly connects it to a fixed part of the mixer structure.

An advantage of the structure is that all parts of the ejector mechanism except the actuating knob are concealed within the gear casing. Other objects and advantages will be apparent from the following description and the drawings.

In the drawings:

Fig. 1 is a longitudinal vertical sectional view of the forward portion of a food mixer motor and gear unit, partly in elevation, showing the ejector mechanism in normal position.

Fig. 2 is a transverse vertical sectional view in the plane of the line 2—2 of Fig. 1.

Fig. 3 is a view similar to Fig. 1 showing the ejector mechanism as it appears when the actuating knob has been depressed and the beater shafts disconnected from the drive spindles.

Fig. 4 is a perspective view of the actuating knob and push bar to which it is attached, detached from the rest of the mechanism.

Fig. 5 is a perspective view of the ejector lever, detached.

Fig. 6 is a perspective view of the ejector member, detached.

Fig. 7 is an elevational view showing a modification of the ejector member shown detached in Fig. 6.

Fig. 8 is a bottom view of a modified construction of ejector member and part of the mixer housing, and Fig. 9 is a vertical sectional view in the plane of the line 9—9 of Fig. 8.

In that embodiment of the invention shown in the drawings, a motor housing 10 provided with a handle 11 encloses a motor 12 which has a shaft 13 mounted in a motor die casting 14. The latter extends forwardly as indicated at 15 into the gear housing 16 connected to the forward end of the motor housing 10. In the upper end of the housing between the handle and gear housing is a motor speed control switch 17 actuated by a disc 18 which need not be described in detail because the switch assembly is not an element of this invention.

Beater shafts 19 have fixed thereon ejector rings 20 and above the rings 20 are nibs 21 which engage the slots 22 in the drive spindles 23. The beater shafts 19 are detachably and drivingly mounted in the drive spindles 23 by spring rings 24 which releasably retain the nibs 21 in the slots 22. The drive spindles 23 are driven by the motor shaft 13, and worm 25 meshes with worm gears 26, 26 fixed on the spindles 23.

The ejector mechanism whereby the shafts 19 are disconnected from the drive spindles 23 now will be described. An ejector member 27 comprises a vertically bored central body 28 having a flat top beveled on its forward edge 29. Horizontally extending arms 30 are apertured at 31 to receive the beater shafts 19 which extend loosely therethrough. The ejector member 27 resembles, in some respects, the ejector shown in U.S. Patent No. 2,797,901, owned by the assignee of this invention and application, in which the horizontal oppositely extending arms have their lower surfaces in different horizontal planes for the purpose of having one ejector arm bear on the ejector ring of one beater shaft before the other ejector arm bears on the ejector ring of the other beater shaft. It is to be understood, however, that although I have shown the ejector arms 30 herein as having their lower surfaces in different horizontal planes, they may be disposed in the same plane and may simultaneously move into bearing contact with ejector rings 20 on the shafts 19.

As shown in Figs. 1, 2 and 3, the ejector member 27 has its central body portion 28 located between the drive spindles 23 and is mounted in the open bottom portion of the motor housing 10 by a bolt 32 which extends upwardly through the central bore in the body 28 into the casting 15. A spring 33 surrounds the bolt 32, bearing at its lower end against the head 34 of the bolt and at its upper end against the shoulder 35 in the body 28 of the ejector member, thus normally holding the said member in the position shown in Figs. 1 and 2. Reinforcing ribs 36 may be provided on the ejector member 28.

An ejector lever 40, shown detached in Fig. 5, has a flat central portion 41 apertured at 42, provided with side ribs 43. Rearwardly the central portion 41 merges with a slightly downturned portion 44 terminating in a curved end 45 whereby the lever is pivotally mounted in a complementally formed recess 46 in the under side of the motor casting 15. Forwardly of the central portion 41, the lever is provided with an upwardly inclined portion 47 terminating in an upturned end 48. The bolt 32 extends through the aperture 42 which is elongated longitudinally of the lever to permit pivotal movement of the lever 40 about the curved end 45 is will be explained hereinafter. As shown in Fig. 2, the casting 15 is shaped to accommodate the flat portion 41 and ribs 42 of the lever 40, with the flat portion 41 resting on the top of the ejector body 28.

Pivotal movement is imparted to the lever 40 by the push bar 50 shown detached in Fig. 4. It comprises a vertically disposed major portion 51 merging at its upper end with an upwardly and rearwardly inclined bar portion 52, both provided with rearwardly directed longitudinally extending ribs 53 which serve as runners bear-

ing against the face of the casting 15 when the parts are assembled in the mixer. An actuating knob 55 is rigidly attached to a short vertically disposed upper end 54 parallel to the major body 51 of the push bar 50. At its lower end the push bar is provided with spaced apart legs 56, the metal of the bar between said legs being bent rearwardly to form a tongue 57.

The ejector member 27 is mounted in the lower forward part of the mixer housing as shown in Fig. 1, by means of the bolt 32 and spring 33 thereon, but before the bolt 32 is screwed into the casting 15, the ejector lever 40 is positioned on the upper surface of the ejector body 28, with the bolt 32 extending through the aperture 42 of the lever, and the curved end 45 is pivotally seated in the recess 46 in the casting 15. The push bar 50 is inserted through an opening 58 in the top wall of the gear casing shaped to fit the knob 55. The lower end of the push bar 50 engages the front face of the casting 15, the legs 56 straddling the portion 47 of the lever 40 and the rearwardly directed tongue 57 contacting the lower surface of the casting 15 as shown in Fig. 1. This is the normal position of the ejector parts when the beater shafts 19 are in operative position in their drive spindles 23.

When it is desired to disconnect the shafts 19 and eject them from the mixer, the knob 55 is depressed as shown in Fig. 3, whereby the push bar 50 is moved downwardly in a vertical direction to depress the forward end of the lever 40. At the beginning of the pivotal movement of the lever 40 about the pivotal mounting 45, 46, the bearing pressure of the lever is directed against the rearward top surface of the ejector body 28. As the pivotal downward movement of the lever 40 progresses, the bearing pressure of the lever portion 41 against the ejector body is exerted progressively in a forward direction until finally it is directed against the beveled area 29 on the ejector body 28. This action of the lever 40 results in moving the ejector member downwardly to bring the arms 30 into contact with the ejector rings 20 on shafts 19 to disconnect and eject the beater shafts, the leverage being applied efficiently by the gradual forwardly progressing bearing contact of the lever portion 41 on the ejector body 28. When the push bar 50 has been moved downwardly completely and pressure on the knob 55 released, the spring 33 on bolt 32 returns the ejector member 27 to its normal position as shown in Fig. 1.

Changes may be made in details of construction and form of parts as herein shown and described without departing from the scope of the invention as defined by the appended claims.

For example, the ejector member 27 may be provided with a forwardly directed guiding rib 60 and a rearwardly directed guiding rib 61 as shown in Figs. 8 and 9. The ribs extend at their lower portions through slots 63 and 62, respectively, in the lower wall of the mixer housing 10, and thus prevent any twisting motion of the ejector 27. The apertured arms 30, 30, of the ejector member 27 are provided with lugs 64, 65, which bear on the ejector rings 20 on beater shafts 19 when the ejector member is depressed, as previously explained. The lugs 64, 65 may be of the same or different depths, to function either like the ejector shown in Fig. 6 where the lower surfaces of the arms 30 are in different horizontal planes, or like the ejector shown in Fig. 7 where the lower surfaces of the arms 30 are in the same horizontal plane. In either arrangement, the ejector member 27 is supported at its upper end by the bolt 32 and is guided to slide vertically by the guiding ribs 60, 61 in the housing slots 63, 62. These and other changes may be made without departing from the invention as defined by the appended claims.

I claim:

1. In a motor driven power unit having a housing provided with a handle and a top wall slotted forwardly of the handle, a bottom wall having an opening therein, a motor frame member between the top and bottom walls, a pair of drive spindles and a tool shaft detachably connected to each of said drive spindles, ejector mechanism comprising an ejecting projection fixed on each tool shaft, an ejector member located above said bottom wall opening in direct alignment with the opening and having its lower end always in the opening, and having means for bearing on said ejecting projections, means yieldingly mounting the ejector member in the housing between said drive spindles, a lever having a generally horizontal bearing portion between its ends bearing on top of the ejector member between said drive spindles, said drive spindles being located in the housing adjacent the ejector member and beneath the lever, said lever having a free end, its opposite end engaging the motor frame member to pivot about a horizontal axis when the free end is depressed, a vertically disposed push bar in the housing, and a knob fixed to the upper end of the push bar projecting above the housing through the slotted top wall, the lower end of the push bar bearing on the free end of the lever, depression of the knob and push bar producing pivotal movement of said lever and downward pressure of said bearing portion of the lever on top of the ejector member to move said member through said bottom wall opening into contact with the ejecting projections on said tool shafts.

2. A motor driven food mixer comprising a motor housing, a gear casing provided with a slotted top wall and a bottom wall having an opening therein connected to the forward end of the motor housing, a motor frame member projecting into the gear casing between the top and bottom walls, a pair of drive spindles, a tool shaft detachably connected to each of said drive spindles, ejector mechanism comprising an ejecting projection fixed on each tool shaft, an ejector member located above said bottom wall opening in direct alignment with the opening and having its lower end always in the opening, and having means thereon for bearing on said ejecting projections, a lever having a generally horizontal slotted bearing portion between its ends bearing on top of the ejector member, said drive spindles being located in the gear casing adjacent the ejector member and beneath the lever, said lever having a free end, its opposite end engaging the motor frame member to pivot about a horizontal axis when the free end is depressed, a headed bolt extending upwardly through the ejector member and the slotted portion of the lever and into the motor frame member, a spring surrounding the bolt between its head and the ejector member, a vertically disposed push bar in the casing, and a knob fixed to the upper end of the push bar projecting above the gear casing through the slotted top wall, the lower end of the push bar bearing on the free end of the lever, depression of the knob and push bar producting a pivotal movement of said lever and downward pressure of said bearing portion of the lever on top of the ejector member to move said member through said bottom wall opening into contact with the ejecting projections on said tool shafts.

3. The mechanism defined by claim 2, in which the ejector member is provided with vertically extending ribs and the edges of the bottom wall of the gear casing surrounding said bottom wall opening have slots which engage said ribs to keep the ejector member from twisting as the ejector member is depressed.

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