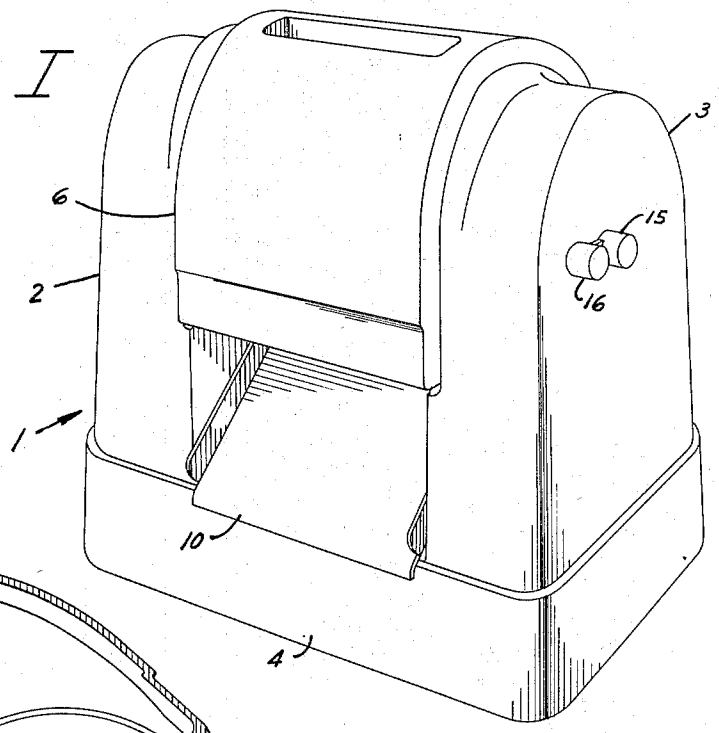
Jan. 16, 1951 A. E. LINDNER ET AL 2,537,946

THRUST BEARING

Filed Oct. 4, 1944 3 Sheets-Sheet 1

Fig. I



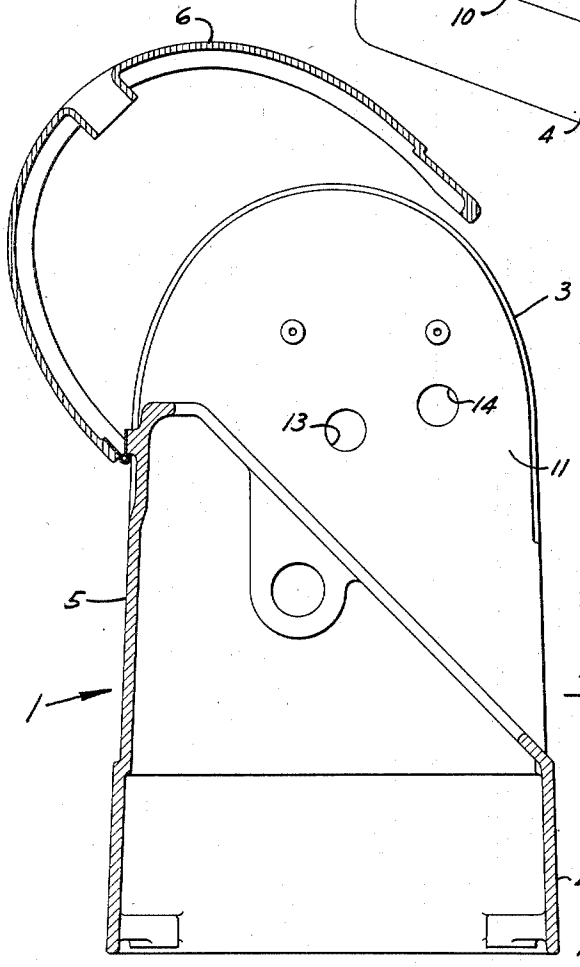


Fig. II

Arthur E. Lindner
Herbert B. Harmon
Bruce E. Robinson
INVENTORS

BY

Marshall & Marshall
ATTORNEYS

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THRUST BEARING

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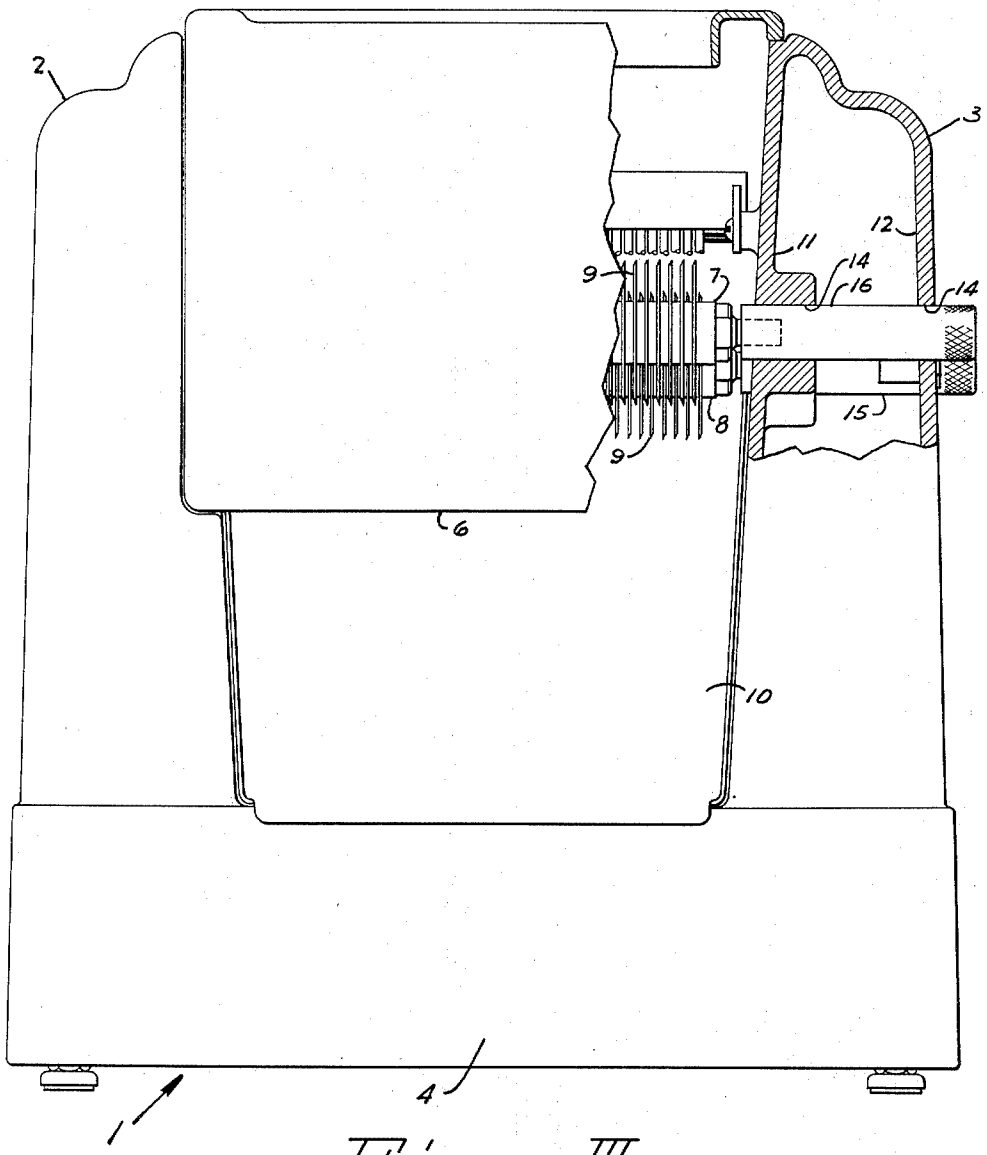

Fig. III

Arthur E. Lindner
Herbert B. Harmon
Bruce E. Robinson
INVENTORS

BY

Marshall & Marshall
ATTORNEYS

Jan. 16, 1951 A. E. LINDNER ET AL 2,537,946

THRUST BEARING

Filed Oct. 4, 1944 3 Sheets-Sheet 3

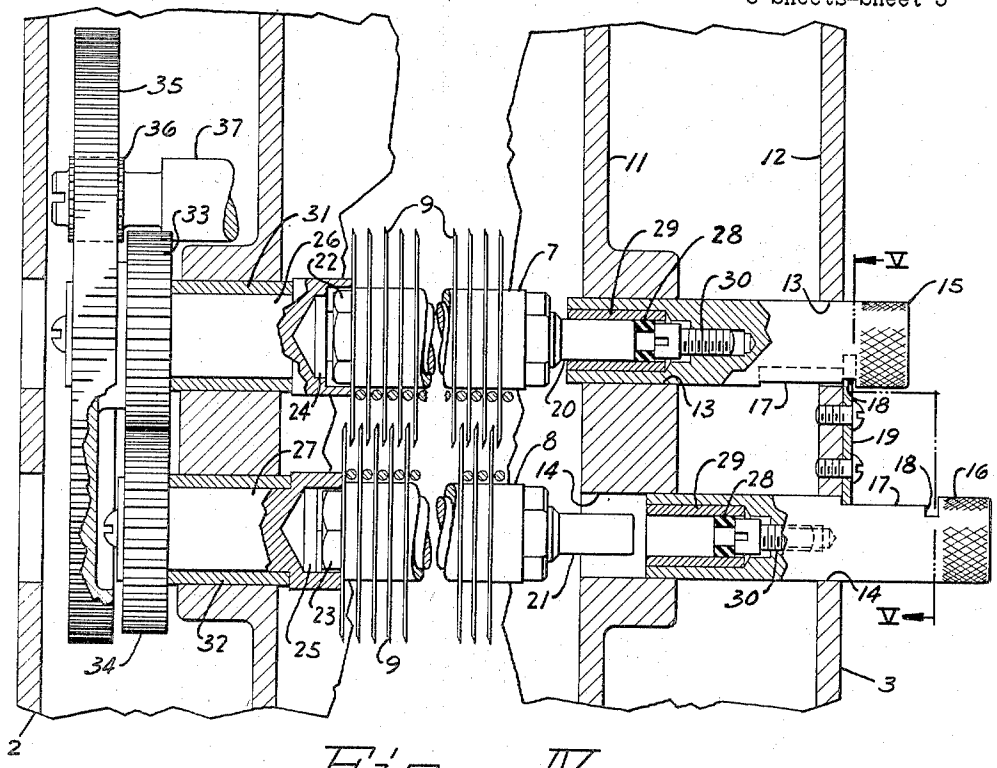

Fig. IV

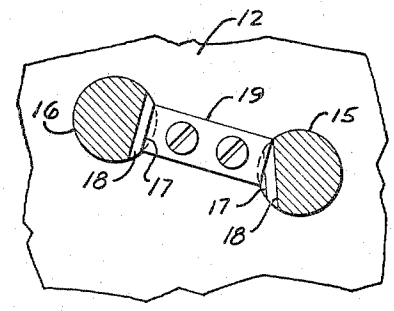

Fig. V

Arthur E. Lindner
Herbert B. Harmon
Bruce E. Robinson
INVENTORS

BY

Marshall & Marshall
ATTORNEYS

Patented Jan. 16, 1951

2,537,946

UNITED STATES PATENT OFFICE

2,537,946

THRUST BEARING

Arthur E. Lindner, Herbert B. Harmon, and Bruce E. Robinson, Toledo, Ohio, assignors to Toledo Scale Company, Toledo, Ohio, a corporation of New Jersey

Application October 4, 1944, Serial No. 557,092

3 Claims. (Cl. 308—166)

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This invention relates to meat tenderizing machines and in particular to an improved housing and means within the housing for journaling the arbors upon which the meat contacting knives are mounted.

In an effort to reduce their size, meat tenderizing machines have been designed and built with the driving mechanism crowded into a hollow housing at one end of the frame. At the other end of the frame the knife-carrying arbors are usually journaled in short sleeves inserted in a relatively thin end wall. This type of construction has the disadvantage that it is difficult to get at the driving mechanism when it requires servicing and that the sleeves must be entirely removed from the end wall in order to release the arbors so that they may be removed for cleaning.

The principal object of this invention is to provide a frame for a tenderizing machine which is symmetrical in external appearance.

Another object of the invention is to provide a frame for a tenderizing machine in which spaced-apart supports are provided for the sleeves journaling the knife-carrying arbors so that the arbors may be released and removed without completely removing the journaling sleeves.

Another object of the invention is to provide the retaining sleeves for the knife-carrying arbors with means which limit the axial motion of the sleeves to that required to release the arbors.

A still further object is to provide the sleeve with means for locking them in place.

A still further object is to provide adjustable thrust washers within the sleeves.

These and other objects and advantages are attained in the structure shown in the drawings which are used to illustrate the invention.

In the drawings:

Figure I is a perspective view of a meat tenderizing machine embodying the invention.

Figure II is a vertical cross section taken through the center part of the frame looking toward the right end housing.

Figure III is a front elevation with parts broken away to show the knife arbor journaling means and the construction of the end housing.

Figure IV is a fragmentary horizontal section taken through the axes of the knife-carrying arbors.

Figure V is a fragmentary end elevation, partly in section, taken along the line V—V of Figure IV.

These specific drawings and the specific description that follows merely disclose and illustrate the invention and are not intended to impose limitations upon the claims.

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According to the invention the housing of a meat tenderizing machine is made symmetrical, the sleeves journaling the ends of the knife-carrying arbors are made axially slidable through a limited distance and adjustable thrust washers are included in the sleeves. These improvements are included in the tenderizing machine shown in the drawings.

The mechanism of this machine is built into a frame 1 comprising a left end housing 2 and a right end housing 3 held in spaced relation by a low front wall 4 joining the front walls of the housings 2 and 3 and a higher rear wall 5 joining the rear walls of the housings. A cover 6 is hinged near the top of the rear wall 5 and cooperates with the end housings 2 and 3 to define an operating chamber for a pair of arbors 7 and 8 upon which a plurality of circular knives 9 are securely mounted.

A seen in Figure II, in end elevation the tops of the housings 2 and 3 and the cover 6 are semicircular in form. Also, it will be noticed that between the housings the interior of the frame is open, and that a removable tray 10 provides the bottom of the operating chamber. The housings 2 and 3 are hollow and are adapted to contain the driving mechanism and the bearings for the arbors 7 and 8. Walls 11 and 12 (Figures III and IV) of the right housing 3 have holes 13 and 14 bored through them in line with the arbors 7 and 8. A pair of sleeves 15 and 16 are axially slidable within the holes 13 and 14. The sleeves 15 and 16 each have a flat 17 milled across one side. Each flat terminates in a deeper notch 18 which, by engaging a plate 19 screwed to the outside of the wall 12, between the holes 13 and 14, retains the cylindrical sleeve in position. The axial motion of the sleeves 15 and 16 is limited by the length of the flats 17 to an amount sufficient to release journals 20 and 21 on the ends of the arbors 7 and 8 respectively. When the sleeves are withdrawn to the position occupied by the sleeve 16, as shown in Figure IV, the arbors 7 and 8 may be moved to the right sufficiently to disengage their hexagonal ends 22 and 23 from mating sockets 24 and 25 formed in the ends of a pair of stub shafts 26 and 27.

When the sleeves are in their locked position (the sleeve 15 is shown locked in Figure IV) thrust washers 28 of suitable material, such as plastic impregnated fiber or bearing metal, are pressed against the ends of the journals 20 and

21 to retain the hexagonal arbor ends 22 and 23 firmly seated in the mating sockets 24 and 25. The thrust washers 28 are press fitted within bearing sleeves 29 which are pressed into the ends of the sleeves 15 and 16. Screws 30, threaded into the bottom of the bores of the sleeves before the thrust washers 28 are installed, are backed out sufficiently to locate the thrust washers in correct relation with respect to the ends of the journals 20 or 21. The thrust washers 28 are provided with axial holes of sufficient diameter to allow a screwdriver to engage the screws 30. Inasmuch as the thrust washers 28 and the bearing 29 are press fitted together and pressed into the sleeve they cannot rotate with respect to the sleeve and, therefore, there is no tendency for the rotation of the arbors to change the adjustment of the screws 30.

The wall 11 of the housing 3 is thicker about the holes 13 and 14 so that the sleeves are adequately guided throughout their limits of axial motion. In operation, when the arbors are installed in the machine, the sleeves are pushed in and are locked in place by rotating each of the sleeves in the direction of rotation of its associated arbor until the plate 19 is seated in the notch 18. Thus, the sleeve 16 is locked by rotating it clockwise as seen in Figure V, while the sleeve 15 is locked by rotating it counterclockwise. If the sleeves are locked by rotating them in their opposite directions they are liable to be unlocked by the rotation of the arbors.

The stub shafts 26 and 27, which support and drive the arbors 7 and 8, are journaled in fixed bearing sleeves 31 and 32, locked into holes bored through a thick portion of the inside wall of the housing 2. The ends of the stub shafts 26 and 27, projecting into the interior of the housing 2, are provided with a pair of intermeshing gears 33 and 34 and, in addition, the stub shaft 26 also carries a large gear 35. The large gear 35 is turned by a pinion 36 carried on the end of a shaft 37 which is connected to a suitable power source.

By thus providing a frame for a meat tenderizing machine with two hollow symmetrical end housings and by providing nonremovable sleeves for journaling one end of each of the knife-carrying arbors, a light weight sturdy machine is produced and the inconvenience of searching for misplaced arbor-retaining sleeves is avoided.

Having described the invention, we claim:

1. A bearing for the end of a knife arbor of a device for tenderizing meat, said bearing comprising a generally cylindrical member adapted to slide axially in a bore in an end frame of the device, said member having an axial hole extending inwardly from one end, a screw that is threaded into the bottom of the hole and that has its head within the hole, a sleeve of bearing material fixedly mounted in the axial hole, and a thrust bearing non-rotatably mounted in the bearing sleeve and supported axially by the head of the screw for axially positioning the thrust bearing in the sleeve.

2. An arbor supporting bearing for a meat tenderizing device comprising a generally cylindrical member adapted to slide axially in a bore in an end frame of the device, said member having a shallow notch extending along a substantial portion of the length of the member exclusive of its end portions and a deeper notch at one end of the shallow notch, a plate fixed to the end frame and engaged in the shallow notch for limiting axial movement of the member, said plate also being engageable in the deeper notch to lock said member, said member having an axial blind hole in one end, a bearing sleeve non-rotatably mounted in the hole and a thrust bearing mounted at the bottom of the hole.

3. An arbor supporting bearing for a meat tenderizing device comprising a generally cylindrical member adapted to slide axially in a bore in an end frame of the device, said member having a shallow notch extending along a substantial portion of the length of the member exclusive of its end portions and a deeper notch at one end of the shallow notch, a plate fixed to the end frame and engaged in the shallow notch for limiting axial movement of the member, said plate also being engageable in the deeper notch to lock said member, said member having an axial blind hole in one end, a bearing sleeve non-rotatably mounted in the hole, a thrust bearing mounted in the hole, and a screw tapped into the bottom of the hole with its head interposed between the thrust bearing and the bottom of the hole for axially supporting the thrust bearing.

ARTHUR E. LINDNER.
HERBERT B. HARMON.
BRUCE E. ROBINSON.

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