Dec. 28, 1943. F. P. HESS 2,337,604

FOOD CHOPPER

Filed April 10, 1943

Fig. 1.

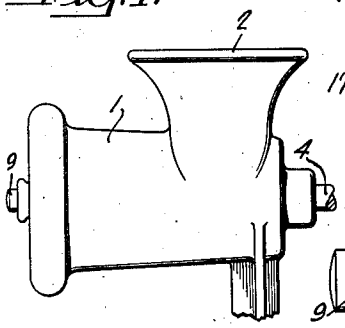


Fig. 2.

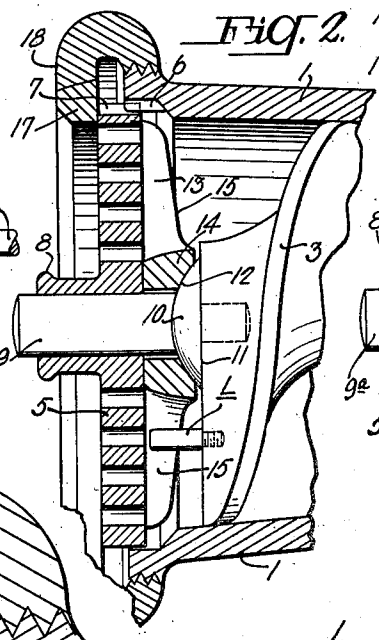
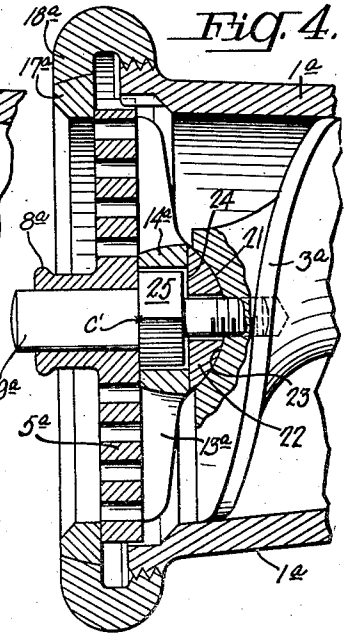


Fig. 4.



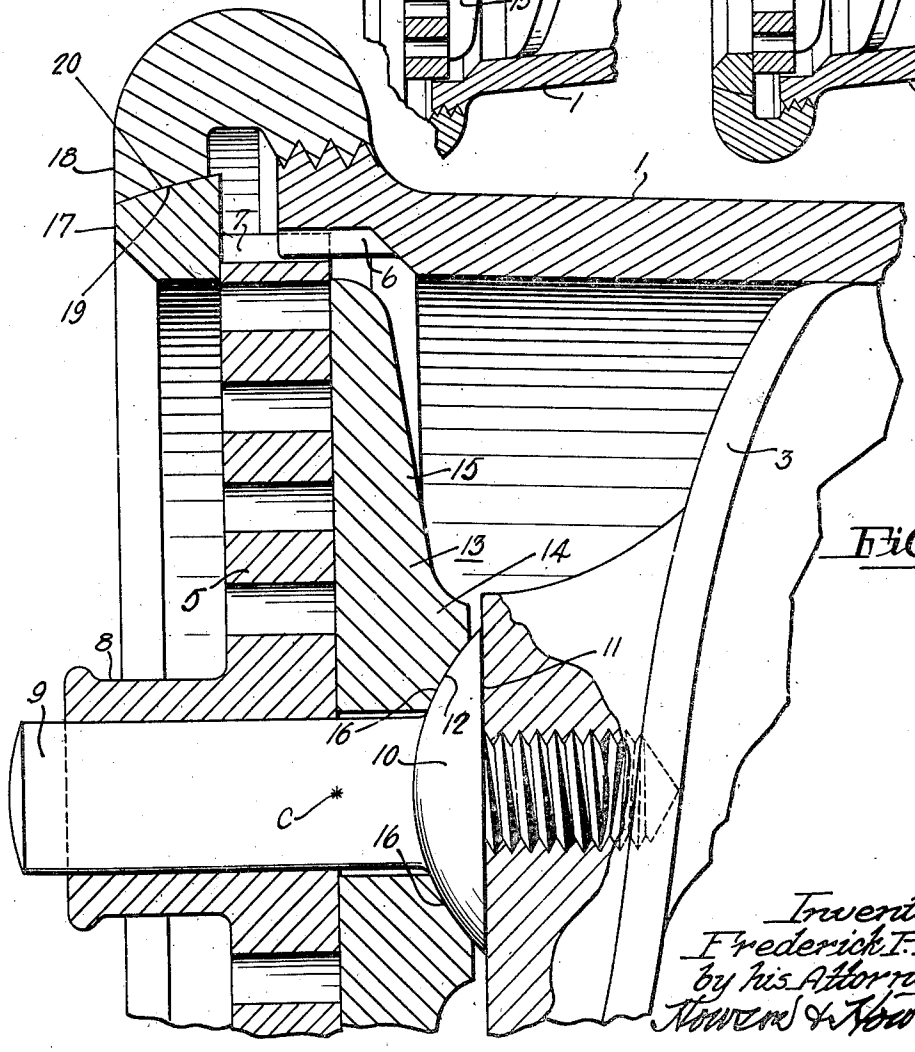


Fig. 3.

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UNITED STATES PATENT OFFICE

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FOOD CHOPPER

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6 Claims. (Cl. 146—189)

This invention relates to new and useful improvements in food handling apparatus, and more particularly to devices of this general character commonly known as choppers for cutting and grinding foodstuffs such as meat, vegetables and the like.

Devices of this character, for the most part, comprise a barrel in which rotates a spiral conveyor and at the discharge end of the barrel there is located a perforated head plate in contact with the inner surface of which the usual cutting member, driven by the rotatable conveyor, is adapted to rotate and thereby reduce the foodstuff fed through the barrel by the conveyor to minute portions by a severing or shearing action. Heretofore, in such devices, considerable difficulty has been encountered by reason of the inability to maintain the cutting surfaces of the rotating cutting member truly parallel, and in uniform pressure contact, with the adjacent surface of the perforated head plate against which said cutting surfaces rotate.

When the contacting surfaces of the cutting member and perforated head plate are not properly assembled in, or get out of, true parallelism with respect to each other, even to a slight degree, the contact pressure of the cutting member against the adjacent surface of the perforated head plate is increased in one or more portions of the disc of rotation described by the cutter and is lessened in other portions with the result that the cutting surfaces of the cutter become unevenly worn to an extent that they very often do not even contact the surface of the perforated head plate in some portions of the disc of rotation of the cutter. This condition requires that the cutting member, repeatedly and not infrequently, be removed from the device and sharpened or reground to provide coplanar cutting surfaces which will reside in truly parallel relation with respect to the adjacent surface of the perforated head plate against which they rotate. The necessity for sharpening or regrinding the cutting member in such devices arises all too frequently and, in many cases, when the cutting member is sharpened or reground there is not exercised the proper degree of care and accuracy to insure that the surfaces of the cutting member are coplanar and substantially normal to the axis of rotation of the cutter.

With the foregoing in mind, the principal object of the present invention is to provide a device of the character set forth which embodies certain novel features of construction and arrangement whereby true parallelism and uniform contact pressure between the cooperating surfaces of the cutting member and perforated head plate may be readily provided and maintained.

Another object of the invention is to provide a device of the character described wherein means are provided to enable the cutting element and the perforated head plate to be properly reassembled in the device in a truly parallel relation and in uniform contact pressure when it becomes necessary to remove and sharpen the cutting member.

A further object of the invention is to provide a device of the type described which embodies novel features of construction and arrangement operable automatically to effect proper positioning of the head plate and cutting member with respect to each other as the plate retaining collar is tightened upon the barrel of the device.

These and other objects of the invention and the various features and details of the construction and arrangement of parts therein are hereinafter fully set forth and described, and shown in the accompanying drawing, in which:

Figure 1 is a view in side elevation of a food chopper embodying the present invention;

Figure 2 is an enlarged fragmentary view partially in section of the discharge end of the chopper disclosed in Figure 1;

Figure 3 is a still further enlarged fragmentary view of a portion of the disclosure in Figure 2 illustrating the features and details of the construction and arrangement of the parts in accordance with the present invention; and

Figure 4 is a view similar to Figure 2 showing the modified form and construction of the present invention.

Referring now more particularly to the drawing, the invention is shown as applied to a food chopper of generally well-known construction comprising a barrel 1 and a hopper 2 feeding thereto. A spiral conveyor or scroll 3 is rotatably mounted within the barrel 1 and this is rotated in the usual manner to force material longitudinally through the barrel to the severing or cutting devices by means of a hand crank or power driven pulley which may be secured upon the externally projecting shaft portion 4 of the conveyor or scroll 3.

As shown, the inner wall of the barrel 1 tapers or flares slightly toward the discharge end thereof and terminates in a generally cylindrical portion of larger diameter in which is mounted the usual perforated head plate 5 which is held

against rotation within the barrel 1 by any suitable means such as a lug or the like 6 arranged to engage a groove or slot 7 in the periphery of said head plate. The head plate 5 is also provided centrally thereof with a sleeve 8 forming a bearing for the trunnion 9 of the conveyor 3, the trunnion 9 being threaded into the discharge end of said conveyor 3 axially thereof as shown.

In the present instance, and comprising one of the novel features of construction of the present invention, the conveyor trunnion 9 is formed to provide integrally therewith a radially projecting portion 10 the inner surface 11 of which is flat and adapted to seat firmly against the discharge end face of the conveyor 3 and the outer or discharge end face of which is of generally spherical configuration as indicated at 12.

Rotatably mounted upon the conveyor trunnion 9 is a cutting member 13 comprising an annular central head portion 14 from which projects a plurality of radial cutting arms 15. As best shown in Figure 3 of the drawing, the inner end face of the head portion 14 of the cutter 13 is provided with a spherical concave recess 16 having the same radius of curvature as the surface 12 of the trunnion portion 10 so that when the cutter 13 is positioned upon the trunnion 9 the spherical concave recess 16 in the cutter head 14 will seat upon said spherical surface 12 of the portion 10 of said trunnion 9 in the manner shown in the drawing. In order to permit the cutter 13 to swivel or pivot to some extent upon the spherical surface 12 of the projecting portion 10 of the trunnion 9, the central bore through the cutter member head 14, which receives the trunnion 9, is made slightly larger than the diameter of said trunnion 9 as indicated. In the present instance, the cutter 13 is rotationally driven by the conveyor 3, relative to the head plate 5, by means of a lug L which projects from the end face of said conveyor and engages behind one of the cutting arms 15 of the said cutter 13 as shown.

Further, in accordance with the present invention, the perforated head plate 5 is held inwardly of the discharge end of the barrel 1 and against the cutting surfaces of the arms 15 of the cutter 13, and the latter in turn is held against the spherical surface 12 of the projection trunnion portion 9 by means of a ring 17 and a collar member 18 which is threaded upon the external extremity of the barrel 1. In the present instance the ring 17 is positioned outwardly of the perforated head plate 5 and engages the latter against the peripheral edge portion of the outer surface thereof as shown, the ring 17 being retained in place in engagement with the head plate 5 by means of the collar 18 aforesaid.

In accordance with the present invention the interengaging surface portions 19 and 20 of the ring 17 and collar 18, respectively, are of spherical section, or curved, cross-sectionally thereof as shown and preferably the radius of curvature of these surfaces 19 and 20 are described from the point C which, it will be observed, is located centrally of the cutting face of the cutter 13. Similarly the radius of curvature of the spherical surface 12 of the projecting portion 10 of trunnion 9 preferably is equal to the distance between said point C and the peripheral edge of said radially projecting trunnion portion 10.

In assembling the device of Figures 1 to 3 of the drawing, with the scroll or conveyor 3 properly mounted in the barrel 1 the cutter 13 is positioned on the trunnion 9 with its recess 16 abutting the spherical surface 12 of the trunnion portion 10. The perforated head plate 5 is then positioned upon the trunnion 9, after which the ring 17 is positioned outwardly thereof in contact with its peripheral edge portion and the collar 18 is then threaded onto the barrel 1. In threading the collar 18 onto the barrel, this is done slowly at the start and as said collar 18 is slowly tightened against the ring 17 and the latter in turn against the head plate 5 and cutter 13 which abuts the spherical surface 12 of the trunnion portion 10, the spherical surface portion 12 of said projecting portion 10 and the interengaging spherical or curved surfaces of the ring 17 and collar 18 cooperate automatically to cause the cutting member 13 and the perforated head plate 5 to assume positions relative to one another with their contacting surface portions truly parallel and in uniformly even contact pressure with one another.

When the collar 18 has been threaded onto the barrel 1 relatively slowly as aforesaid for a sufficient length of time to permit the cutter 13 and head plate 5 to adjust themselves to the relationship aforesaid, the collar 18 may be tightened home to permanently secure and maintain the head plate 5 and cutter member 13 in the proper relationship with respect to each within the discharge end of the barrel 1 of the device.

A modified form of the invention is shown in Figure 4 of the drawing and this construction is generally similar to that previously described except for the mounting of the cutter member. In this form of the invention the conveyor trunnion 9a is threaded into the discharge end of said conveyor or scroll 3a axially thereof as aforesaid, and there is formed in the discharge end face of the conveyor 3a, concentrically of the trunnion 9a therein, a concave recess 21 the surface of which is spherical or curved and preferably has a radius of curvature described from the point C'. Circumscribing the trunnion 9a in slightly spaced relation with respect thereto and seated in the spherical recess 21 of the conveyor 3a is an annular member 22, having a similarly configurated or shaped inner surface portion 23 arranged for contact with the surface of the conveyor recess 21 and a flat or plane outer face 24 against which the flat inner face of the head 14a of the cutter member 13a is adapted to seat or abut in the manner shown.

The bore through the head 14a of the cutter member 13a which receives the trunnion 9a is not circular and preferably is square, hexagonal, or of similar shape to receive therewithin a correspondingly shaped nut portion 25 to rotationally drive the cutter 13a upon rotation of the conveyor or scroll 3a.

Similarly in the form of invention shown in Figure 4, the perforated head plate 5a, and in turn the cutter 13a are automatically properly positioned and secured in the barrel 1a by means of a ring 17a and collar 18a constructed and arranged in the manner hereinabove set forth with regard to the ring 17 and collar 18.

From the foregoing, it will be seen that the present invention provides a food chopper which is constructed and arranged automatically to provide and maintain the contacting surfaces of the

head plate and cutter member in true parallel relation and in uniform contact pressure with respect to each other with the result that uneven wear of the cutting surfaces of the cutter is minimized. Too, the construction and arrangement of parts according to the invention are such that the cutter may be removed from the chopper for sharpening when necessary, and then be reassembled and secured readily and easily in the device in proper parallel relation, and in uniform contact pressure, with the adjacent surface of the perforated head plate.

While certain ramifications of the present invention have been illustrated and described herein, it is not intended to limit the invention to such disclosures but that changes and modifications may be made and incorporated therein within the scope of the claims without departing from the spirit of the invention.

I claim:

1. In a food chopper comprising a hollow barrel, a feed conveyor rotatably mounted in said barrel, a perforated head plate removably mounted in the end of the barrel and having a central hub, a trunnion projecting coaxially from the end of said feed conveyor and mounted in the hub of said head plate, a cutter on said trunnion inwardly of the head plate contacting the surface thereof and rotatable with the conveyor, a cutter mounting providing universal adjustment of said cutter with respect to the feed conveyor, a ring engaging the outer edge portion of the head plate, and a collar threaded on said barrel and having a surface engaging the peripheral surface of said ring to retain the latter, said head plate and the cutter in the end of said barrel, the interengaging surfaces of said collar and ring being of corresponding spherical section in a direction longitudinally of the barrel and cooperating with each other and with said cutter mounting so that when said collar is tightened upon the barrel the cutter and head plate are caused to assume and maintain positions with their adjacent surfaces parallel and in uniform pressure contact.

2. In a food chopper comprising a hollow barrel, a feed conveyor rotatably mounted in said barrel, a perforated head plate removably mounted in the end of the barrel and having a central hub, a trunnion projecting coaxially from the end of said feed conveyor and mounted in the hub of said head plate, a cutter on said trunnion inwardly of the head plate contacting the surface thereof, a driving connection between the conveyor and cutter for rotating the latter with said conveyor, a cutter mounting providing universal adjustment of said cutter with respect to the feed conveyor, a ring engaging the outer edge portion of the head plate, and a collar threaded on said barrel and having a surface engaging the peripheral surface of said ring to retain the latter, said head plate and the cutter in the end of said barrel, the interengaging surfaces of said collar and ring being of corresponding spherical section in a direction longitudinally of the barrel and cooperating with each other and with said cutter mounting so that when said collar is tightened upon the barrel the cutter and head plate are caused to assume and maintain positions with their adjacent surfaces parallel and in uniform pressure contact.

3. In a food chopper comprising a hollow barrel, a feed conveyor rotatably mounted in said barrel, a perforated head plate removably mounted in the end of the barrel and having a central hub, a trunnion projecting coaxially from the end of said feed conveyor and mounted in the hub of said head plate, a cutter on said trunnion inwardly of the head plate contacting the surface thereof and rotatable with the conveyor, said cutter having a centrally located spherical recess in the inner side thereof, a cutter mounting having a spherical surface portion engaging said cutter recess and providing universal adjustment of said cutter with respect to the feed conveyor, a ring engaging the outer edge portion of the head plate, and a collar threaded on said barrel and having a surface engaging the peripheral surface of said ring to retain the latter, said head plate and the cutter in the end of said barrel, the inter-engaging surfaces of said collar and ring being of corresponding spherical section in a direction longitudinally of the barrel and cooperating with each other and with said cutter mounting so that when said collar is tightened upon the barrel the cutter and head plate are caused to assume and maintain positions with their adjacent surfaces parallel and in uniform pressure contact.

4. In a food chopper comprising a hollow barrel, a feed conveyor rotatably mounted in said barrel, a perforated head plate removably mounted in the end of the barrel and having a central hub, a trunnion projecting coaxially from the end of said feed conveyor and mounted in the hub of said head plate, a cutter on said trunnion inwardly of the head plate contacting the surface thereof, said cutter having a centrally located spherical recess in the inner side thereof, a driving connection between the conveyor and cutter for rotating the latter with said conveyor, a cutter mounting having a spherical surface portion engaging said cutter recess and providing universal adjustment of said cutter with respect to the feed conveyor, a ring engaging the outer edge portion of the head plate, and a collar threaded on said barrel and having a surface engaging the peripheral surface of said ring to retain the latter, said head plate and the cutter in the end of said barrel, the interengaging surfaces of said collar and ring being of corresponding spherical section in a direction longitudinally of the barrel and cooperating with each other and with said cutter mounting so that when said collar is tightened upon the barrel the cutter and head plate are caused to assume and maintain positions with their adjacent surfaces parallel and in uniform pressure contact.

5. In a food chopper comprising a hollow barrel, a feed conveyor rotatably mounted in said barrel, a perforated head plate removably mounted in the end of the barrel and having a central hub, a trunnion projecting coaxial from the end of said feed conveyor and mounted in the hub of said head plate, said conveyor having a spherical recess in the end thereof arranged concentrically of the trunnion, a cutter on said trunnion inwardly of the head plate contacting the surface thereof and rotatable with the conveyor, a cutter mounting intermediate said cutter and conveyor having a spherical surface portion engaging the conveyor recess and providing universal adjustment of said cutter with respect to the feed conveyor, a ring engaging the outer edge portion of the head plate, and a collar threaded on said barrel and having a surface engaging the peripheral surface of said ring to retain the latter, said head plate and the cutter in the

end of said barrel, the interengaging surfaces of said collar and ring being of corresponding spherical section in a direction longitudinally of the barrel and cooperating with each other and with said cutter mounting so that when said collar is tightened upon the barrel the cutter and head plate are caused to assume and maintain positions with their adjacent surfaces parallel and in uniform pressure contact.

6. In a food chopper comprising a hollow barrel, a feed conveyor rotatably mounted in said barrel, a perforated head plate removably mounted in the end of the barrel and having a central hub, a trunnion projecting coaxially from the end of said feed conveyor and mounted in the hub of said head plate, said conveyor having a spherical recess in the end thereof arranged concentrically of the trunnion, a cutter on said trunnion inwardly of the head plate contacting the surface thereof, a driving connection between the conveyor and cutter for rotating the latter with said conveyor, a cutter mounting intermediate said cutter and conveyor having a spherical surface portion engaging the conveyor recess and providing universal adjustment of said cutter with respect to the feed conveyor, a ring engaging the outer edge portion of the head plate, and a collar threaded on said barrel and having a surface engaging the peripheral surface of said ring to retain the latter, said head plate and the cutter in the end of said barrel, the inter-engaging surfaces of said collar and ring being of corresponding spherical section in a direction longitudinally of the barrel and cooperating with each other and with said cutter mounting so that when said collar is tightened upon the barrel the cutter and head plate are caused to assume and maintain positions with their adjacent surfaces parallel and in uniform pressure contact.

FREDERICK P. HESS.