ABSTRACT: An anvil member and an impact member are guided for independent movement in alignment with each other and provided with relatively adjacent socketed ends for holding between them a nut to be cracked. A hammer is guided for movement in alignment with the impact member and resilient means are provided for urging the hammer into striking engagement with the impact member. For periodically retracting the hammer against such resilient means and releasing it on each cracking stroke, there is provided a sprocket having means for engaging and retracting the hammer throughout a portion of the movement of the sprocket chain and then releasing the hammer to commence its stroke. The anvil member is provided with a longitudinal slot opening through its socketed end and guiding it on a track for movement toward and away from the impact member, the arrangement being such that the end of the track is movable through the slot to clear the socketed end of the anvil as the anvil is retracted.

For confining the shell fragments as the nut is cracked, a shield is telescopically disposed on the anvil member for projection toward the impact member to encompass a nut held between the two members.
This invention relates to improvements in a nut cracker of the class in which a nut to be cracked is disposed between an anvil and an impact member, both guided for movement on a suitable base, the impact member having a restricted stroke to crack the nut shell against the anvil without crushing the nut meat when the impact member is subjected to a sharp blow.

As a primary object of the present invention to improve upon a nutcracker of the above general type, as disclosed in my pending application, Ser. No. 782,293, filed Dec. 9, 1969, now U.S. Pat. No. 3,524,486, granted Aug. 18, 1970, by providing an automatic power drive mechanism for same. Also, it is an object to provide an improved guiding and mounting means for the movable anvil member which is capable of ejecting nuts or fragments thereof from the socketed end of that member on each retraction of the anvil member and which is so arranged as to avoid being obstructed by nut shell fragments.

In accordance with the present invention, the hammer which is resiliently projected into striking engagement with the impact member, is periodically retracted against its resilient actuating or projecting means and then released for an operative cracking stroke by actuating means which includes an endless flexible element guided for movement in an endless circuit having an operative run parallel to the movement of the hammer. Means carried by the flexible element and the hammer are operable to couple the two together for return of the hammer and thereafter automatically to release it after a predetermined degree of retraction.

Further, in accordance with the invention, the anvil member is formed with a rectilinear slot in one side thereof slidably receiving a trackway on which the anvil is supported and guided for movement with respect to the impact member, the said slot intersecting the socketed end of the anvil member in a manner such that retraction of the anvil away from the impact member will project the track through the end of the slot to eject cracked nuts or fragments thereof from the socketed end of the anvil member. Such an arrangement for mounting and guiding the anvil member has the added advantage of maintaining the slot and tracks substantially free of shell fragments such as might obstruct the movement of the anvil member.

The foregoing as well as other incidental objects and advantages are attained by the preferred embodiment in the invention illustrated in the accompanying drawings in which:

FIG. 1 is a plan view of a power driven nutcracker embodying the present invention.

FIG. 2 is a rear elevation of the structure shown in FIG. 1.

FIG. 3 is a vertical section of the line 3--3 of FIG. 1 looking in the direction of the arrows.

FIG. 4 is an enlarged detailed cross section on the line 4--4 of FIG. 1 looking in the direction of the arrows, and

FIG. 5 is a somewhat enlarged detailed cross section on the line 5--5 of FIG. 1 looking in the direction of the arrows.

Referring now in detail to the accompanying drawings, it has been found convenient in the preferred embodiment of the invention to support various of the parts on a generally rectangular flat base 10, the front portion of which is furred off by vertical walls to define a nut supply bin 12 for containing an ample supply of nuts to be cracked by the invention. A cracked nut receiving bin 14 is defined at the rear of the base by suitable upstanding marginal walls of which the wall 16 is common to the supply bin 12 and constitutes a partition between the two bins 12 and 14. Since the nut supply bin 12 in the embodiment shown is appreciably longer than the nut receiving bin 14, its rear wall is formed conjointly by the partition 12 and a wall portion 18 which is slightly forwardly from the partition 16. Since the cracking of the nuts will take place at a predetermined location lengthwise of the partition 16 and directly thereabove, the upper edge of the partition at such a location is formed with a beveled portion defining a nut chute 20 sloping downwardly to direct the cracked nuts into the receiving bin 14.

The major components of the cracking mechanism comprises an anvil 22 and an impact member 24, both supported for relative independent movement in alignment with each other and arranged so that they may be brought toward each other to receive the opposite ends of a nut in sockets 25 and 26, respectively, formed in their relatively adjacent ends. The impact member 24 is restricted to a small range of movement above and just to one side of the chute 20, whereby a nut held between the members 22 and 24 will automatically be positioned above the chute. The arrangement is such that when the impact member 24 is struck by hammer 28, the resulting limited stroke of the impact member cracks the nut against the comparatively heavier and more massive anvil member, following which retraction of the anvil member to the right in FIGS. 1, 2 and 3, away from the then stationary impact member 24 permits the cracked nut to drop on to the nut chute 20 for delivery into the cracked nut receiving bin 14. The bin 14 is preferably open at one end so that the cracked nuts may readily be swept theretofrom from time to time into a suitable receptacle for subsequent separation from the nut meats from the shells.

In the embodiment here illustrated, the anvil member 22 is guided for movement on a rectilinear track or rail 30 which is affixed to and projects upwardly in a vertical plane from the partition wall 16 at one side of the nut chute 20, and is provided with a longitudinal slot 31 opening through both ends thereof and intersecting its socketed end 25 in a manner such that withdrawal of the anvil member away from the impact member after the cracking of a nut will relatively project the guide rail 30 into the socket in a lengthwise direction to eject any portion of the cracked nut tending to remain therein and thus to free the nut so that it may fall readily onto the chute 20.

While the anvil member 22 is comparatively massive in its structure so as to have a comparatively high inertia to permit breaking of the nut shell under impact by the impact member, the impact member 24 by way of comparison, is constructed to have substantially lighter weight and lower inertia so that when struck by the hammer 28, it will readily be projected against the nut. The socketed end of the impact member 24 constitutes an enlargement at one end of the guide stem or shank 32 of the impact member which is slidably disposed through a bracket or bearing 34 affixed to the rear wall portion 18 of the supply bin. The opposite end of the guide stem 32 supports another enlargement or impact receiving portion 36, the arrangement being such that the space between the enlargements 36 and the enlarged socketed end of the anvil member permits a limited movement of the said member in alignment with the anvil member 22. If desired, the operative stroke of the impact member may be somewhat cushioned by the resilient washer 38 slidably encircling the guide stem 32 between the bearing 34 and the enlargement 36 thereof.

In order to protect the operator's eyes against flying shell fragments, as well as to provide a ready means of manually manipulating the anvil member 22, there is provided a suitable hollow shield 40 which conformingly receives and is relatively slidably telescopically disposed on the anvil member 22, the shield being formed with a longitudinal slot or opening 42 coextensive in length therewith for reception of the rail 30 which slidably supports the anvil member. Normally, the shield is resiliently retracted toward the inoperative end of the anvil member to expose the socketed end thereof for reception of a nut to be jointly supported between the members 22 and 24. To this end, there is shown resilient means in the form of rubber bands 43 tensioned around and between a pin 44 affixed to the anvil member and a rib 46 (FIG. 4) constituting a portion of the shield and projecting outwardly therefrom, there being a cover and retaining plate 48 affixed to the outer extremity of the rib. The plate 48 serves to retain the rubber bands on the rib as well as to prevent contact of the user's hand with the rubber bands.

The shield 40 may be manually telescopically projected beyond the socketed end of the anvil member 22 and toward
the impact member 24 to substantially encompass a nut supported between the two members as shown in FIG. 4, thus to shield the eyes of the operator from flying shell fragments.

The hammer 28 in the present embodiment assumes the form of an elongated rigid beam of rectangular shape in cross section which is guided for left and right movement in alignment with the anvil and impact members 22 and 24 by a suitable trackway 50 of hollow or tubular structure and of substantially rectangular cross section as shown in FIG. 5, except that it has one corner portion removed for accessibility and to avoid interference with certain projecting parts of the hammer hereinafter described.

As shown in FIG. 1, the hammer 28 is resiliently urged into striking engagement with the impact member 24 by resilient means such as the rubber bands 52 which are tensioned between the laterally projecting pins 54 and 56 of the hammer 28 and the guide bearing 34 for the impact member.

Although the hammer may be actuated manually by grasping the pin 54, withdrawing the hammer rearwardly against the elastic action of the rubber band or spring means 52 and releasing it to be projected forwardly into striking engagement with the impact member 24, it is the purpose of the present invention to provide a power actuated means for automatically and repeatedly withdrawing and releasing the hammer to crack nuts which are manually positioned between the impact and anvil members 22 and 24 between strokes of the hammer.

To this end, and as shown in FIGS. 1 and 2, there is supported on the base 10 at the rear of the nut supply bin 12, a conventional electric gear motor 58 having a sprocket wheel 60 keyed on its output shaft. A further sprocket wheel 62 is rotatably supported on a sub shaft 64 affixed to the rear wall portion 18 of the supply bin.

The laterally spaced sprocket wheels 60 and 62 exemplify means for supporting a flexible endless element in the form of a sprocket chain 66 for movement through an endless circuit in which the upper run of the chain moves parallel to the hammer 28 and in a direction to retract the hammer 28 away from the impact member 24.

For periodically retracting and releasing the hammer, the chain is provided with one or more laterally projecting pins or detents 68 shown in FIGS. 1 and 2 as extending horizontally beneath the hammer for operative engagement with a projection 70 in the form of a pin affixed to the hammer and depending vertically therefrom in the path of movement of the detents 68.

The arrangement is such that shortly after each detent 68 commences its operative movement with the upper run of the sprocket chain 66, it engages the depending projection 70 of the then forwardly projected stationary hammer 28, and thereafter carries the hammer rearwardly until the hammer is fully retracted, at which time the downward movement of the detent 68 around the drive sprocket 60 disengages the detent 68 from the hammer projection 70 to release the hammer for its cracking stroke.

It will be appreciated that the detents 68 are sufficiently spaced apart on the sprocket chain and the speed of that chain through its operative circuit is such that after each operative stroke of the hammer, there will be sufficient time to permit manual retraction of the anvil 22, release of the cracked nut, the replacement of the cracked nut by a fresh nut from the supply bin 12, and the manual projection of the shield 40 over the freshly loaded nut, before the next operative stroke of the hammer.

In the operation of the invention which is believed to be apparent from the foregoing description, a supply of nuts to be cracked is placed in the nut supply bin 12, and the motor 58 is energized through conventional switch means (not shown). Through coaction of the motor driven sprocket chain 66 and the hammer 28, the hammer is repeatedly retracted against the action of the rubber bands 52 and, at the end of each retraction stroke is released to be automatically propelled by said rubber bands through its operative stroke to strike sharply against the impact member 24, thereby propelling the latter through the limited impact stroke permitted of it, whereby to crack the shell of a nut positioned between the anvil and impact members 22 and 24. Immediately following each operative hammer stroke, the shield 40 is manually moved in a direction to uncover the nut and to retract the anvil member 22 from the impact member 24 sufficiently to have the guide rail 30 project into the socketed end of the anvil member to expel any nut fragments therein so that all of the cracked nut will drop on to the sloping chute 20 and fall into the cracked nut bin 14. A fresh nut is placed between the anvil and impact members and the anvil member 22 is then urged toward the impact member 24 by suitable manual force on its associated shield 40, causing the nut to be clamped between the two members 22 and 24, following which the movement of the shield 40 toward the impact member is continued sufficiently to cause the shield to cover the nut in time for the next following operative stroke of the hammer. Following such stroke the foregoing operations are repeated.

Claim:

1. A nutcracker comprising an anvil member, an impact member, and means supporting said members for independent rectilinear movement in alignment with the adjacent ends of said members being formed with opposing sockets for supporting between them a nut to be cracked, a hammer guided for rectilinear movement in alignment with said impact member, means resiliently urging said hammer into striking engagement with said impact member, and power actuating means for periodically retracting said hammer away from the impact member and releasing said hammer, said power actuating means including an endless flexible element having a portion movable parallel to the movement of said hammer, and means for intermittently coupling said portion of the element to said hammer to retract the latter.

2. A nutcracker comprising an anvil member, an impact member, and means supporting said members for independent movement in alignment with each other, the adjacent ends of said members being formed with opposing sockets for supporting between them a nut to be cracked, a hammer guided for rectilinear movement in alignment with said impact member, means resiliently urging said hammer into striking engagement with said impact member, and power actuating means for periodically retracting said hammer away from the impact member and then releasing said hammer, said power actuating means including an endless flexible element having a portion movable parallel to the movement of said hammer, and means for intermittently coupling said portion of the element to said hammer to retract the latter.

3. A nutcracker as defined in claim 2, comprising means for confining said impact member to a limited and predetermined range of operative movement.

4. A nutcracker as defined in claim 2, in which said operative run of the endless element is substantially coextensive in length with the operative stroke of the hammer.

5. A nutcracker as defined in claim 4 wherein said endless element comprises a sprocket chain, and the means guiding said element for movement in an endless circuit comprises a pair of relatively spaced sprocket wheels, the means driving said element through its said circuit comprising an electric gear motor connected in driving relation to one of said sprocket wheels.

6. A nutcracker as defined in claim 2 in which the means for supporting said anvil member for movement in alignment with said impact member comprises a rectilinear track having an end spaced from said impact member a distance in excess of the length of a nut to be cracked, said anvil member being formed with a rectilinear slot in one side thereof slidably receiving the said track and supporting the anvil member for movement along the track, said slot intersecting the socket in
said end of the anvil member, whereby retraction of said anvil member away from the impact member on the track will cause the track to move relatively into said socket to eject cracked nuts therefrom.

7. A nutcracker as defined in claim 6 including a shield telescopically disposed on said anvil member for movement relative thereto in alignment with said impact member for encompassing a nut held between said members.

8. A nutcracker comprising a nut supply bin, a cracked nut bin adjacent the nut supply bin, a vertical partition between said bins, a chute on said partition sloping downwardly toward said cracked nut bin, an anvil member and an impact member respectively guided for independent movement in alignment with each other above said chute, and having relatively adjacent socketed ends to engage and support between them a nut to be cracked above said chute, a hammer and means driving same for movement into striking engagement with said impact member to crack the nut against said anvil member, resilient means for urging the hammer into striking engagement with said impact member, and automatic means for periodically retracting and releasing said hammer.

9. A nutcracker as defined in claim 2 wherein said means supporting said anvil member for movement in alignment with said impact member comprises a track slidably disposed within a slot formed in said anvil member and intersecting said socketed end of the anvil member, said track being withdrawn from the said socketed end when the anvil member is advanced toward the impact member to hold a nut between said members, said track being relatively projected into said socketed end to eject the cracked nut therefrom when the anvil member is withdrawn from the impact member after the nut is cracked.

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