To all whom it may concern:

Be it known that I, HENRY MAYBURN JONES, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Nut-Cracking Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification.

My invention relates to machines for cracking various kinds of nuts, and more particularly pecans, wherein the nuts are fed automatically from a suitable holder or hopper to suitable cracking means and then delivered to any suitable receptacle.

The object of my invention is to provide a simple and efficient mechanism whereby the nuts may be economically handled, their shells properly fractured, and whereby all of the parts of the mechanism may be easily maintained, inspected or adjusted and whereby these parts may be cheaply produced.

In the drawing, Figure 1, is a sectional side elevation of a machine embodying my invention and showing all of the mechanism for cracking the nuts. Fig. 2, is an end view, partly in section taken on the dotted line A—A of Fig. 1, looking in the direction of the arrow, and showing the feeding mechanism as well as parts of the cracking mechanism in end elevation.

The same numerals of reference are used to indicate identical parts in both figures of the drawing, in which—

1 represents the main frame of the operating mechanism provided with ways 2 within which the carriage 3 is mounted in such a manner that it is free to slide in a manner to be later described. An adjustable anvil 4 is mounted in the frame 1 and backed by set-screw 5 by means of which the position of the anvil may be changed should occasion require. Mounted in the carriage 3, and free to slide therein, is a cracking plunger 6 provided with shoulder 7 and stop 8 and normally pressed toward the anvil 4 by means of the coiled spring 9 which lies in the pocket for the plunger and bears against the collar thereof. Projecting outward from the shoulder 7 and through a slot 10 in the side of the carriage 3, is a pin 11 which engages the lower forked arm 12 of the rocker arm or bell crank 13. The upper arm of this bell crank 13 has a forked or divided end consisting of the two members 14 which are pivotally connected to the links 15 which in turn are pivotally connected to the equalizing member 16. A cross head 17 is mounted on the carriage 3, free to slide thereon, and is operated by the toggle arms 18 which are pivotally connected to it and the carriage 3 as shown. These toggle arms 18 are operated in a manner and by mechanism to be presently described. Depending from the rear part of the carriage 3 and between the ways thereof is an operating lug 19 to which is pivotally connected one of a pair of toggle arms 20 the other of which is pivotally connected to the rear wall of the frame 1, as at 21, and these toggle arms are operated in a manner and by mechanism to be presently described. Suitably journaled in the frame 1, as at 22, Fig. 2, is the cam shaft 23 which is driven by the bevel gear 24 meshing with the pinion 25 on the shaft 26. The latter shaft may extend to any convenient point and be provided with any suitable pulley or other means for causing its rotation. Secured on the cam shaft and within the frame 1 is the carriage operating cam 27 which bears against the under face of a lever 28. The lever 28 is journaled as by pin 29 to a suitable boss extending inward from the frame 1, and this lever has its free end attached to the link 30 which in turn is attached to the toggle arms 20. A coiled spring 31 is attached to the end wall of the frame and has its other end so attached to the lever 28 that the latter is normally held down against the cam 27 as will be readily seen by referring to Fig. 1. Mounted on the shaft 23, adjacent to the cam 27, is the cracking cam 32 which bears against the roller 33 mounted in the forked end of the rocker lever 34, which latter is pivoted to the side wall of the frame 1 on the side opposite to that on which the lever 28 is pivoted. This lever 34 is connected through the rod 35 with the toggle arms 18 and is normally held in proper position by the coiled spring 36, which, like the spring 31, is attached to the end wall of the frame 1.

Referring more particularly to Fig. 2, a suitable hopper 37 is provided into which the nuts to be cracked are placed and a conveyor 38, provided with suitable nut retaining depressions 39, passes into the lower portion of the hopper and thence out.
through the upper portion thereof and over a sprocket or guide wheel 40 and thence horizontally past the nut cracking devices and over a feed mechanism consisting in part of sprocket 41 and thence downward under guide wheel 42 to the place of beginning.

The feed mechanism comprises the cylindrical cam 43 with its circumferential groove within which the roller 44 travels. The roller 44 is pivoted to the arm 45 which is suitably pivoted to the frame or to a table on which the frame rests and its upper end carries the pawl 46 which engages the teeth of the ratchet wheel 47 in such manner that at every revolution of the shaft 23 this mechanism advances the ratchet wheel one tooth, and with it, the feed wheel 41 a corresponding amount.

The operation of the machine is as follows: Assuming the parts of the machine to be in the positions shown in Fig. 1, it will be seen that as the shaft 23 revolves in the direction indicated by the arrow, the rocker arm 34 will be operated to raise the toggle-arms 35 and force the cross head 17 forward thus operating the cracking plunger 6 to crack the nut shown between it and the anvil 4. It is to be noted that the shaft 23 revolves constantly, and that as its revolution continues, the cam 32 will pass by the roller 33 and permit the toggle arms 35 to return the position shown while at the same time the cam 27 will pass out from under the lever 28 and permit the spring 31 to become effective to return the carriage 3 to its rear position; the toggle arms 35 then assuming the position shown by the dotted lines. As the carriage begins to travel to its rear position as described above, the spring 9 presses the cracking plunger against the cracked nut until the carriage has moved a distance equal to the space between the stop 8 and the carriage, while at the same time the equalizing device 16 assumes its lowest position, whereupon the cam completes its rearward travel and all of the parts carried thereby remain stationary with relation to the carriage. The carriage remains in its rear position until the cam 27 reengages the lever 28 whereupon the lever is again raised and through its connections moves the carriage forward again to crack the next nut and in its forward movement, carries with it the parts mounted thereon. As the carriage travels forward the plunger comes against the nut to be cracked before the carriage reaches the end of its stroke and the resistance offered by the nut stops the movement of the plunger and as the carriage continues its travel while the plunger remains stationary with relation to the frame of the machine, there is a movement between the pin 11 and bell crank 13 operates the equalizing device so that the back face thereof remains in a constant position with relation to the cross head 17, so that at the completion of the forward stroke of the carriage all of the cracking mechanism is set ready for the cracking stroke of the cross head. This brings all of the parts shown in Fig. 1 back to the positions shown in this figure.

I will now describe the mechanism for feeding the nuts to the cracking mechanism. This consists of the hopper 37 which is provided with a channel 48 through which the conveyer 38 passes, and this channel is opened into the inner space of the hopper 30 at or near its lower end so that the nuts in the hopper may pass to and upon the conveyer and arrange themselves in the saddles 39. The bottom of the hopper is formed as shown in order to assist the nuts in finding their proper positions in the saddles. While the carriage 3 remains in its rear position as described above, the axial rise in the groove of the cam 43 operates the roller 44 and through it, the arm 45 and the pawl 46 which is retracted from the tooth with which it is shown engaged and drops into the next tooth of the ratchet wheel 47 and on the return of the pawl, the ratchet wheel is turned the proper amount and it, carrying with it, the sprocket 41, moves the conveyer to carry the cracked nut away from in front of the cracking plunger and brings an uncracked nut into position. The setting of the cams 27, 22 and 43 is such that each performs its functions while the others are not producing any movement, or in other words while the carriage operating cam is holding the carriage stationary at the forward end of its travel, the cracking cam comes into action and as its action ceases the carriage operating cam permits the return of the carriage to its rear position and then the conveyer cam comes into action to move or advance the conveyer, as will be readily understood.

While I have shown a machine in which but a single nut is cracked at a time, it is obvious that the anvils and cracking mechanisms may be multiplied to crack more than one nut at a time without in any way departing from the spirit of my invention and while I have shown a wedge as constituting a part of the equalizing mechanism, there are other forms and devices which could be successfully used and positively controlled in position by the size of the nut to be cracked.

Having thus fully described my invention, I claim,

1. In equalizing mechanism for nut cracking machines, the combination of a reciprocating carriage, a cracking plunger mounted and having reciprocating movement therein, an equalizing element suspended adjacent the rear end of said plunger, an arm...
pivoted on said carriage adjacent said plunger and supporting said equalizing element, and an operating connection between said arm and plunger.

5 2. In a nut cracking machine, the combination of a stationary anvil against which the nuts are to be cracked, a cracking plunger, a carriage upon which said plunger is mounted, mechanism for operating said plunger to crack the nuts, mechanism for operating said carriage, and equalizing mechanism controlled by said plunger whereby when said carriage has reached the limit of its travel all of the parts are properly set for the cracking of the nut.

3. In a nut cracking machine, the combination of an anvil, a cracking plunger having only a rearward motion with relation to its carriage when setting an equalizing mechanism, a carriage upon which said plunger is mounted, operating mechanism for said carriage, mechanism for imparting a fixed forward movement to said plunger to crack a nut, equalizing mechanism wholly controlled in its position by the size of a nut, and a suitable frame for the machine.

4. In a nut cracking machine, the combination of a stationary anvil, a cracking plunger, a carriage upon which said plunger is mounted, operating mechanism for said carriage, mechanism for imparting a predetermined forward movement to said plunger to crack a nut, feeding mechanism for presenting nuts successively to the cracking mechanism, equalizing mechanism wholly controlled in its position by the size of a nut, and a suitable frame for the machine.

5. In a nut cracking machine, the combination of a stationary anvil, a cracking plunger, a carriage for said plunger, predetermined cracking-stroke mechanism carried by said carriage, and equalizing mechanism actuated by the plunger according to the size of the nut to be cracked.

6. In a nut cracking machine, the combination of a stationary anvil, a cracking plunger, a carriage for said plunger, predetermined cracking-stroke mechanism carried by said carriage, equalizing mechanism actuated by the plunger according to the size of the nut to be cracked, and operating means for the various mechanisms.

7. In a nut cracking machine, the combination of an anvil, a cracking plunger, a carriage for said plunger, predetermined cracking-stroke mechanism carried by said carriage, equalizing mechanism wholly controlled in its movement and position by the size of a nut to be cracked, feeding mechanism for presenting nuts successively to the cracking mechanism, and operating means for the various mechanisms.

8. In a nut cracking machine, the combination of an anvil, a cracking plunger, a carriage for said plunger, predetermined cracking-stroke mechanism carried by said carriage, equalizing mechanism wholly controlled in its movement and position by the size of a nut to be cracked, feeding mechanism for presenting nuts successively to the cracking mechanism, and a single operating shaft for imparting movement to the various mechanisms.

9. In a nut cracking machine, the combination of an anvil, a cracking plunger, a carriage for said plunger, cracking-stroke mechanism carried by said carriage, equalizing mechanism wholly controlled in its movement and position by the size of a nut to be cracked, and means whereby after the nut is cracked the equalizing mechanism will be returned to a proper starting point for a subsequent operation.

10. In a nut cracking machine, the combination of an anvil, a cracking plunger, a carriage for said plunger, cracking-stroke mechanism for said plunger, equalizing mechanism wholly controlled in its movement and position by the size of a nut to be cracked, means whereby after a nut is cracked the equalizing mechanism will be returned to a proper point for a subsequent operation, and feeding mechanism for presenting nuts successively to the cracking mechanism.

11. In a nut cracking machine, the combination of a frame, a cam shaft journaled therein, a reciprocating carriage mounted thereon, toggle operating devices for said carriage and operated from said cam shaft, a cracking cross head mounted on said carriage, toggle operating devices for said cross head and mounted on and traveling with said carriage and operated from said cam shaft, a cracking plunger mounted on said carriage, and an equalizing element imposed between said cross head and said plunger and operated through said plunger by the size of a nut to be cracked.

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