

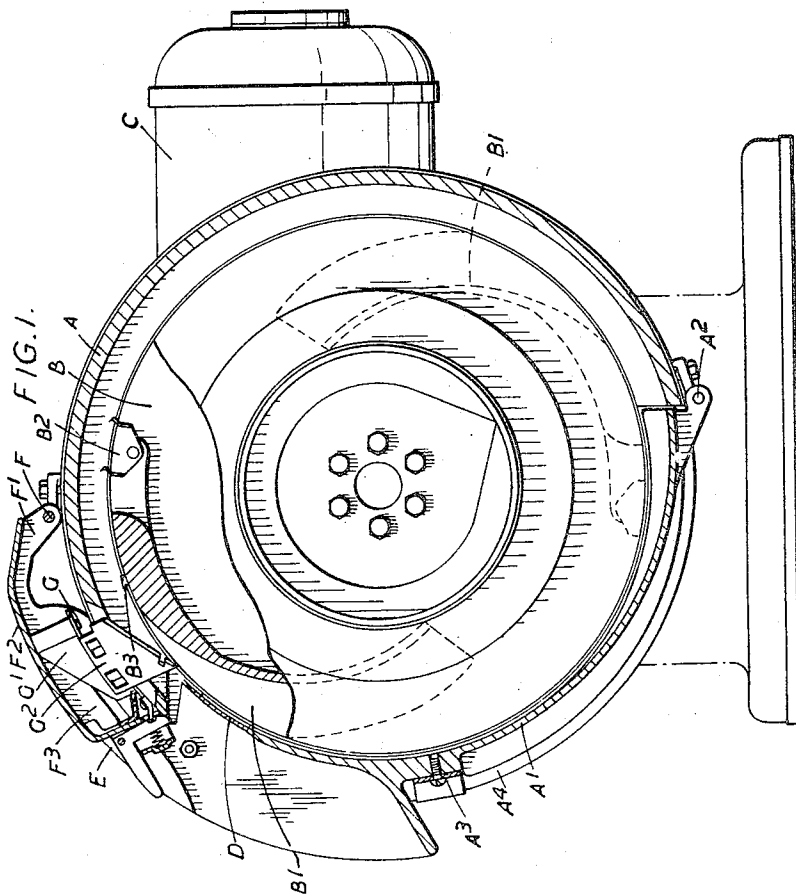
March 20, 1951

G. J. ABBOTT
MACHINE FOR CUTTING POTATOES OR LIKE
OBJECTS INTO CHIPS OR SLICES

2,545,720

Filed Sept. 9, 1948

3 Sheets-Sheet 1



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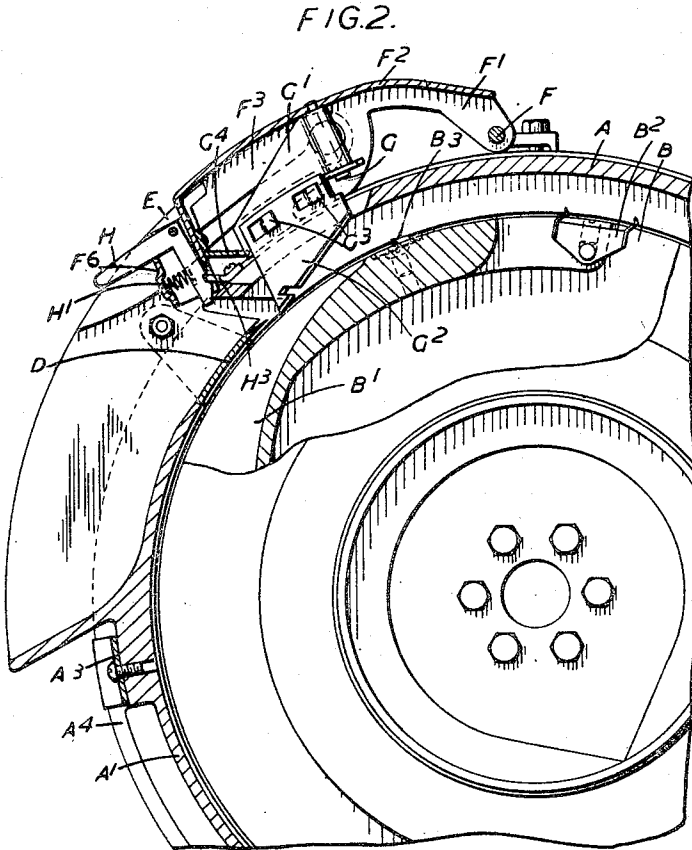
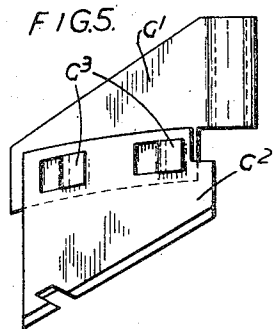
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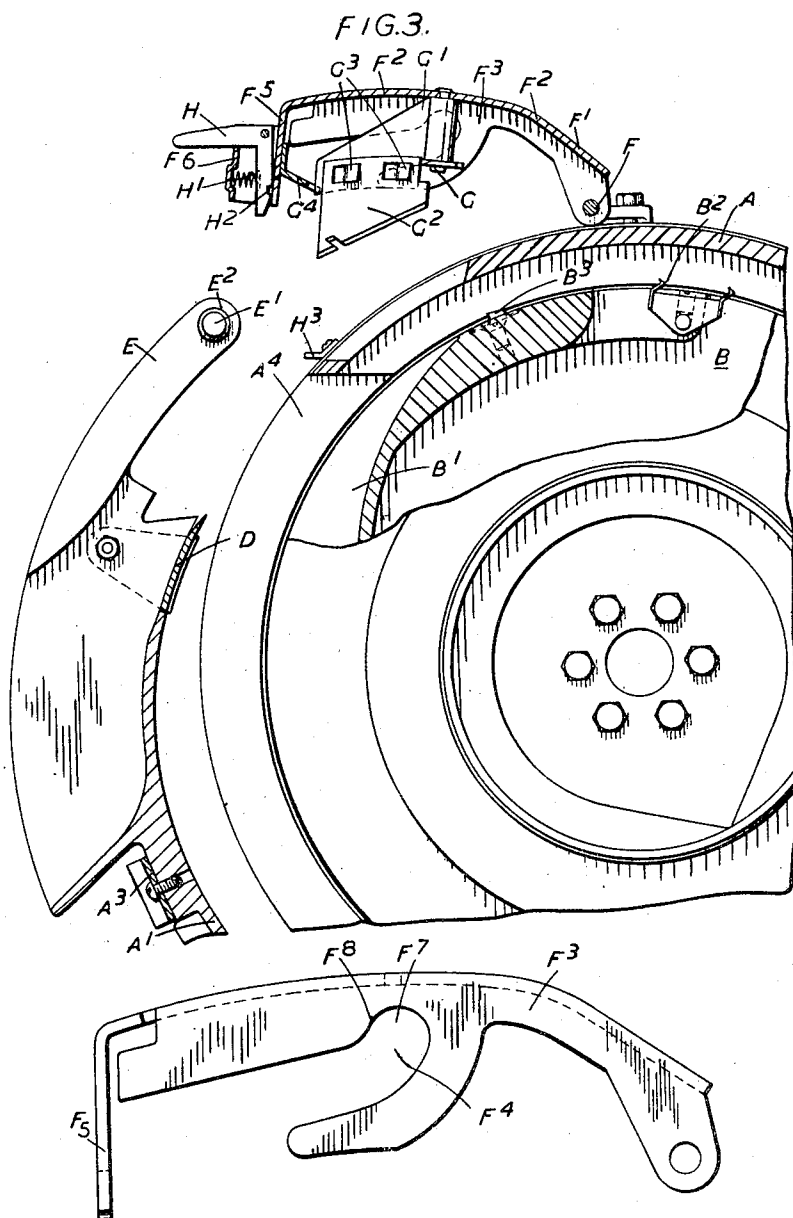
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UNITED STATES PATENT OFFICE

2,545,720

MACHINE FOR CUTTING POTATOES OR LIKE
OBJECTS INTO CHIPS OR SLICES

Geoffrey Joseph Abbott, Carshalton, England

Application September 9, 1948, Serial No. 48,386
In Great Britain October 6, 1947

4 Claims. (Cl. 146—78)

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This invention relates to machines for cutting potatoes or like objects (hereinafter called potatoes) into chips or slices, of the kind in which the potato, or the part thereof to be sliced, is passed between a number of approximately parallel slitting knives which thus slit it longitudinally, and then into engagement with a slicing knife which slices off the previously slit portion of the potato. For convenience such machines will be referred to herein as slicing machines.

In such slicing machines the slitting and slicing knives are usually supported from the circumferential wall of a casing in which rotates a rotor having at least one channel-like passage or throat of converging cross section formed between it and the circumferential wall of the casing so that potatoes which enter this throat through its open larger end during rotation of the rotor, are carried round by the rotor in contact with the circumferential wall of the casing into engagement with the slitting and slicing knives. One example of such a machine is described in the specification of British Patent No. 379,800 while certain improvements, which may also be incorporated in machines according to the present invention, form the subject of United States patent applications No. 765,353 of 1946 and No. 765,354 of 1946, which became Patent No. 2,485,344 on October 18, 1949.

In slicing machines of the kind referred to the knives are apt to be damaged by stones or other hard foreign objects which are not always abstracted from the potatoes before entering the machine while in some cases such stones may jam the rotor and cause damage to other parts of the machine.

The object of the present invention is to provide a slicing machine of the kind referred to incorporating means which will tend to minimise or eliminate damage to the knives or other parts of the machine due to the presence of stones or like hard foreign bodies in or amongst the potatoes being sliced.

In a slicing machine of the kind referred to according to the present invention the slitting knives are so movably mounted that while they are normally held in their operative positions against the normal forces due to their slitting action, they are yet capable of yielding individually or as a body to permit each knife to move partially or wholly out of its operative position under the action of a stone or other hard foreign body which may be carried into engagement therewith by a potato being sliced.

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The term "operative position" is to be understood as meaning the normal position in the path of the potatoes being sliced.

In a preferred arrangement the initial movement of the slitting knives or of each slitting knife releases spring operated mechanism which on release acts on the slitting knife or knives to move it or them rapidly into a position out of the path of the potato being sliced. Thus the initial movement of the slitting knife or knives is in effect a triggering movement which releases mechanism for effecting the remainder of the movement with a snap action.

In one such arrangement the spring operated mechanism includes a spring pressed part which normally acts on a surface on a slicing knife support such that it exerts little or no force thereon in the direction in which the support is capable of yielding, but which moves during the initial movement of the slitting knife support under the action of a stone onto a surface such that it exerts an appreciable force on the slitting knife support in the direction in which it is capable of yielding.

In any case the initial movement of the slitting knife support preferably releases spring operated mechanism for moving the slicing knife out of the path of the potato being sliced so as to prevent its being engaged by any stone or the like which acts on a slitting knife.

For example the slicing knife may be mounted upon a pivoted support acted upon by one or more springs normally tending to move the support so as to carry the slicing knife out of the path of the potatoes being sliced, and catch mechanism between the slicing knife support and a slitting knife support which is automatically released by the initial movement of the slitting knife support and releases the slicing knife support. In such an arrangement the slicing knife support conveniently acts directly or indirectly on the slitting knife support or supports to carry the slitting knives out of the path of the potato being sliced so that the slicing knife support and its spring or springs constitutes the spring operated mechanism referred to above which, upon release by the initial movement of a slitting knife, moves the slitting knives out of the path of the potato being sliced. In such an arrangement the slicing knife support may be constituted by a door or cover hinged to the casing of the machine at the end remote from the slicing knife while the catch mechanism has associated with it a stop which normally limits the movement of the cover, upon release of the catch

mechanism, to that necessary to carry the slicing knife out of the path of the potato being sliced but can at will be moved to permit the cover to be opened completely to give access to the interior of the casing for inspection or cleaning.

In any case in a machine according to the present invention the slitting knives are preferably held in their normal operative positions by one or more springs which are adjustable to vary the force required to cause them to yield under the action of a stone or the like, although a weight, also preferably adjustable, may be provided for this purpose, or a combination of weight and spring or springs might be employed.

The invention may be carried into practice in various ways but one construction according to the invention incorporating also the inventions forming the subject of United States patent applications No. 765,353 of 1946 and No. 765,354 of 1946, which became Patent No. 2,485,344 on October 18, 1949, is illustrated by way of example in the accompanying drawings, in which

Figure 1 is a side elevation, partly in section of the complete machine,

Figure 2 is an enlarged view similar to Figure 1 showing the parts of the machine to which the present invention is applied, in their normal operative position,

Figure 3 is a similar view to Figure 2 showing the parts of the machine in an inoperative position permitting access to the interior of the machine, and

Figures 4 and 5 are enlarged views of certain parts of the machine.

In the construction illustrated in the drawings the machine comprises a generally cylindrical casing A containing a rotor B arranged to be driven by an electric motor C. The casing A has an opening therein extending around nearly half its circumference and normally substantially closed by a hinged cover plate A1 pivoted to the casing A at A2. The cover plate A1 has secured to its upper edge a slicing knife D and its normal position is such, as shown in Figures 1 and 2, that this slicing knife lies somewhat nearer to the axis of the rotor than does the internal circumferential surface of the casing A and close to the circumferential surface of the rotor B. Thus there is a circumferential space of appreciable radial dimensions between the outer surface of the rotor B and the inner surface of the casing A but the cover plate A1 over most of its area lies close to the rotor B as does the slicing knife D.

Secured to the cover plate A1 is a transverse leaf spring A3 the ends of which, when the cover plate is in its normal position as shown in Figures 1 and 2 engage and press on the circumferential edges of the end walls A4 of the casing A so as to tend to move the cover plate A1 outwards towards the position shown in Figure 3.

Formed on the upper end of the cover plate A1 are two similar extensions E, one on each side, each of which is in the form of an arm which carries near its end and projecting from one face a pin E1 having a roller E2 mounted on it. Each extension E with its pin E1 and roller E2 cooperates with mechanism hereinafter described to hold the cover plate A1 normally in the position shown in Figures 1 and 2 against the action of the spring A3.

Pivotally mounted on the casing A at F is a member F1 combining the function of a support for the slitting knives and a retaining member for holding the cover plate A1 normally in the position shown in Figures 1 and 2. The member F1

has an outer wall F2 from which project radially inwardly a number of pivot pins G, on each of which is freely pivoted a slitting knife holder G1 to which is rigidly attached a slitting knife G2 by means of two hook like parts G3 pressed out of the support G1 and passing through slots in the knife G2 as shown most clearly in Figure 5. Each of the knife supports G1 is free to swing about its pivot but this swinging movement is limited by a stop plate G4 secured to the member F1 and having slots therein in which the free ends of the supports G1 lie so that their free movement is limited by the ends of the slots.

Projecting inwardly from the outer wall F2 of the member F1 are two similar webs F3 each of the form shown most clearly in Figure 4 provided with a cam slot F4 formed for engagement by the roller E2 when the parts are in their normal operative positions.

The member F1 also has an end wall F5 on the outer surface of which is carried a small housing F6 in which is arranged a pivoted latch member H acted upon by a spring H1 and having a notch H2 adapted, when the parts are in their normal operative position as shown in Figures 1 and 2 to cooperate with a catch member H3 on the casing A.

The operation of the machine is as follows:

During normal operation the parts occupy the positions shown in Figures 1 and 2, in which the rollers E2 lie in the end portions F7 of the cam slots F4 which are so formed that in this position the force exerted by the rollers on the member F1 due to the force of the spring A3 is radial or nearly radial to the pivot F and hence there is little or no tendency for the member F1 to be rocked upwardly about its pivot. In addition the engagement between the notch H2 of the latch member H and the catch member H3 under the action of the spring H1 resists such pivotal movement of the member F1. The parts are thus retained in the position shown in Figures 1 and 2.

The rotor B is of the form described in the specification of United States patent application No. 765,353 of 1946 or No. 765,354 of 1946 and thus has throats B1 into which the potatoes to be sliced find their way, and devices indicated at B2 and B3 for carrying the last pieces of potato through the slitting and slicing knives in a manner which will not be further described since it is well known and in itself it forms no part of the present invention.

In the construction according to the present invention shown in the drawings, the force of the spring H1 and the slope of the cooperating surfaces of the notch H2 and the catch member H3 are such that the force exerted through the slitting knives G2 on the member F1 by potatoes being forced past the slitting knives and slit thereby will be insufficient to cause the notch H2 and catch member H3 to be forced out of engagement with one another. If and when, however, a stone or other hard substance is carried round by the rotor and comes into engagement with one or more of the slitting knives, the outward force thus applied to these is sufficient to force the member F1 outwards against the retaining force of the members H and H3 and thus to release the latch member H from the catch member H3. The consequent small outward movement of the member F1 permits the rollers E2 to pass round the parts F8 of the cam slots F4 so that the rollers exert a tangential force on the member F1 and thus lift this member rapidly. Thus the slitting knives G2 and slicing knife D

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are moved outwards with a snap action so as to lie completely outside the circle represented by the inner surface of the casing A.

It will thus be seen that the initial movement of the member F1 due to the action of a stone or the like on a slitting knife acts in effect as a triggering movement enabling the spring A3 to come into effective action to move the slitting and slicing knives into their inoperative positions.

The automatic outward movement of the member F1 and the cover plate A1 caused by a stone striking one of the slitting knives referred to above will be limited by the roller E2 coming into contact with the end wall F5 of the member F1, but in order to enable the interior of the casing A to be readily inspected or cleared and any foreign body therein readily removed, the member F1 can be swung by hand into the position indicated in Figure 3 so as to permit the cover plate A1 to be swung outwards as far as may be desired.

What I claim as my invention and desire to secure by Letters Patent is:

1. A machine for slicing potatoes and like articles comprising a substantially cylindrical casing having an exit slot in its circumferential wall, a slicing knife forming one boundary of the exit slot, a movable support for the slicing knife, a rotor within the casing for carrying potatoes or like articles around the casing in contact with the inner surface of its circumferential wall, a slitting knife support pivoted to the casing, a plurality of slitting knives carried by the slitting knife support in advance of the exit opening and slicing knife and, when the slitting knife support is in its operative position projecting into the casing, yielding means for normally holding the slitting knife support and the slicing knife support in their operative positions in which they project into the interior of the casing but capable of yielding when a slitting knife is struck by a stone or other hard object, and an operative connection between the slicing knife support and the slitting knife support to cause the slicing knife and slitting knives both to be moved from the interior of the casing when a slitting knife is struck by a stone or like hard object.

2. A machine as claimed in claim 1 in which the slicing knife support when in its operative position is acted upon by a spring tending to

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move the slicing knife out of the interior of the casing, and the slicing knife support acts on the slitting knife support under the action of such spring in a direction tending to move the slitting knives out of the interior of the casing, holding mechanism being provided for holding the slicing and slitting knife supports in their operative positions against the action of the spring during slicing and slitting operations, and yielding means which yield to permit release of the holding mechanism when a stone or like hard article strikes a slitting knife and moves the slitting knife support.

3. A machine as claimed in claim 2 in which the slicing knife support is pivoted to the casing at the end remote from the slicing knife and has a projection at the end adjacent to the slicing knife which engages a cam surface on the slitting knife support having a part which, when the slicing and slitting knife supports are in their operative positions, is engaged by the projection and lies substantially at right angles to the direction in which the slitting knife support can move, and a part which is inclined to such direction and onto which the projection automatically moves on the initial movement of the slitting knife support under the action of a stone or like hard article.

4. A machine as claimed in claim 3 in which the yielding means for normally holding the slitting knife support comprises spring pressed catch mechanism which retains the slitting knife support in its operative position against forces applied thereto during normal slitting operations but is automatically released by the force exerted thereon when a slitting knife strikes a stone or like hard article.

GEOFFREY JOSEPH ABBOTT.

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