COMMONWEALTH OF AUSTRALIA
PATENTS ACT 1952-1962
APPLICATION FOR A PATENT

(This form may be signed by the applicant or by the Australian Patent Attorney.)

41941/78

We, GIULIANO LANZA and REGINA LANZA, of 13 Blumer Avenue, Griffith, New South Wales; ERMENEGILDO POLI and TAMARA POLI, of 18 Gordon Avenue, Griffith, New South Wales; and MARIO CODEMO and ALVA CODEMO, of 41 Noorilla Street, Griffith, New South Wales, Commonwealth of Australia,

hereby apply for the grant of a Patent for an invention entitled

"VEGETABLE HANDLING DEVICE"

which is described in the accompanying provisional specification.

Our address for service is care of DAVIES & COLLISON, Patent Attorneys,
A.M.P. Building, Hobart Place, Canberra, A.C.T., Commonwealth of Australia.

Dated this 28th day of November, 1977.

Signature(s) of applicant(s).

Note: Initial all Alterations.

To: DESIGNER OF PATENTS
COMMONWEALTH OF AUSTRALIA
PATENTS ACT 1952-1973
DECLARATION IN SUPPORT OF CONVENTION OR
NON-CONVENTION APPLICATION FOR A PATENT
OR PATENT OF ADDITION

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In support of the Application made for a patent
entitled: "Vegetable Handling Device"

We, GIULIANO LANZA and REGINA LANZA, of 13
Blumer Avenue, Griffith, New South Wales;
ERMENEGILDO POLI and TAMARA POLI, of 18
Gordon Avenue, Griffith, New South Wales; and MARIO CODEMO AND ALVA CODEMO, of 41 Noorilla Street, Griffith,
New South Wales, Commonwealth of Australia

do solemnly and sincerely declare as follows:

1. (a) **I am the applicant** for the patent
We are the applicants

or (b) **I am authorized by** GIULIANO LANZA, REGINA LANZA,
ERMENEGILDO POLI, TAMARA POLI, MARIO CODEMO and
ALVA CODEMO,

the applicant(s) for the patent of addition to make this declaration on their behalf.

2. (a) **I am the actual inventor** of the invention

or (b) GIULIANO LANZA of 13 Blumer Avenue, Griffith,
New South Wales, ERMENEGILDO POLI of 18 Gordon Avenue, Griffith, New South Wales, and MARIO CODEMO
of 41 Noorilla Street, Griffith, New South Wales, all Australian citizens,

The said inventors have assigned part of the invention to the said REGINA LANZA,
TAMARA POLI and ALVA CODEMO

State manner in which applicant(s) derive title from inventor(s)

The basic application as defined by Section 141 of the Act was made
in on the
by
in on the
by
in on the
by

4. The basic application referred to in paragraph 3 of this Declaration was
the first application made in a Convention country in respect of the invention the subject
of the application.

Declared at Griffith this TWELFTH day of DECEMBER, 1978.

N.S.W.

(G. & R. LANZA)
(M. & A. CODEMO)
(E. & T. POLI)
Claim 1. A vegetable handling device comprising:

- a main frame;
- a screen mounted on said main frame, said screen comprising a plurality of spaced bars or rods;
- means for reciprocally moving said screen relative to said main frame so as to move vegetables fed onto said screen at one end thereof towards the opposite end thereof;
- at least one cutting blade rotatably mounted underneath and adjacent to said screen; and
- means for rotatably driving said blade or blades;

characterised in that at least some of said spaced bars or rods are mounted for rotation about their longitudinal axes, and means are provided to rotate said rotationally-mounted bars or rods.
The following statement is a full description of this invention, including the best method of performing it known to us:

"VEGETABLE HANDLING DEVICE"
This invention relates to apparatus for handling vegetables, and in particular relates to apparatus for "topping" and "tailing" onions, that is, removing the tops and tails from onions after harvesting.

Known topping and tailing devices for onions, which in some instances are combined with cleaning, grading, sizing and packing devices in a single combine, consist of a wire grate suspended on springs and vibrated at speeds of approximately 900 cycles per minute. Two sets of blades which are rotated at speeds of up to 1650 r.p.m., are mounted under the grate to cut the leaves and roots of the onions which protrude through the grate. The air suction or down draught caused by rotation of the blades, together with the vibration of the grate, cause the onions to move about on the grate as they move longitudinally thereof, so that a greater percentage of the onions have their leaves and roots removed by the device.

Whilst devices of this type are particularly useful since no damage to the onions themselves is possible because the blades do not touch the onions, it is found in practice that their utility is impaired by the comparatively large number of onions which pass along the grate without being topped and tailed. These onions, of course, must be either topped and tailed by hand or returned to the grate to undergo further treatment.

It is an object of the present invention to provide an improvement of devices of this type whereby the efficiency of the device may be improved to such an extent that nearly 100% of topping efficiency is obtained.

According to the present invention, there is provided a vegetable handling device comprising:
a main frame;

a screen mounted on said main frame, said
screen comprising a plurality of spaced bars or
rods;

means for reciprocally moving said screen
relative to said main frame so as to move vegetables
fed onto said screen at one end thereof towards the
opposite end thereof;

at least one cutting blade rotatably mounted
underneath and adjacent to said screen; and

means for rotatably driving said blade or
blades;

characterised in that at least some of said
spaced bars or rods are mounted for rotation about
their longitudinal axes, and means are provided for
rotating said rotatably-mounted bars or rods.

Preferably, the majority or all of the bars or
rods are rotatably mounted.

Preferably, the screen is generally rectangular
and is mounted in a sub-frame which is, in turn, mounted
on the main frame. Preferably also, the reciprocal
movement of the screen is in the longitudinal direction
of the bars or rods. The mounting means for the sub-
frame may include spring members and linkage members
which are pivotally attached at one end to the sub-
frame and pivotally attached at the other end to the
main frame. The means for reciprocally moving the
screen preferably comprises at least one linkage member
which is pivotally attached at one end to the sub-frame
and which at the other end is eccentrically, rotatably
mounted around a rotatable shaft mounted on the main
frame and driven by means such as an hydraulic motor.

Preferably also, at least some of the spaced
bars or rods are rotatably mounted in the sub-frame and
the means for rotating the bars or rods comprises

drive means such as an hydraulic motor which is in
driving engagement with the rotatably mounted bars or rods.

In a preferred embodiment of the invention, all of the bars or rods are rotatably mounted, and the drive means is arranged to reciprocally rotate the bars or rods in a "to-and-fro" manner. In an alternative embodiment, the bars or rods on one side of the screen are rotatably driven in a first direction, with the bars or rods on the opposite side of the screen being rotatably driven in the opposite direction.

The rotational motion of the bars or rods comprising the screen which is provided in accordance with this invention enables an improvement in the efficiency of "topping" and "tailing" onions and similar vegetables. In addition to more effectively orienting the vegetables so that the leaves and roots may be removed by the cutting blade or blades, this rotational motion assists in removal of any clods of dirt or the like which may be adhering to the vegetables. The reciprocating or "to-and-fro" rotational motion described above is particularly preferred as with this type of motion there is no tendency for leaves or roots to be wound around the bars or rods, a problem which can arise in certain instances where the rotation is in a single direction.

Further features of the present invention will be apparent from the accompanying drawings of preferred embodiments of the present invention, which are included by way of illustration of the invention.

In the drawings:

Figure 1 is a side elevational view (partly cut away) of the preferred embodiment of the device of the present invention;

Figure 2 is a plan view of the device illustrated
in Figure 1;

Figure 3 is a detailed view taken along lines III-III of Figure 2, of part of the device of Figures 1 and 2;

Figure 4 is a detailed view, taken in the direction of the arrow IV in Figure 2, of a further part of the device of Figures 1 and 2; and

Figure 5 is a detailed view, similar to Figure 4, of an alternative drive mechanism which may be incorporated into the device of Figures 1 and 2.

Referring firstly to Figure 1, the device of the present invention comprises a main frame 10, and a sub-frame 11 which is mounted and linked to the main frame by spring means 12, 13 and linkage means 14 and 15 to be described in more detail hereinafter.

Portion of the main frame 10 has been cut away in Figure 1 to clearly show blade members 16 and 17, mounted on respective axles 18 and 19, and positioned below the generally rectangular screen (shown in Figure 2) carried by sub-frame 11. The blade members 16 and 17 may, for example, be either two- or four-bladed, and are mounted for rotation in a substantially horizontal plane about vertical rotation axes. The blades are preferably angled so as to provide upper cutting edges and to create a down-draught on rotation.

Drive motor 20 is coupled to the axles 18 and 19 by any suitable means including the belt and pulleys arrangement as shown.

As described above, sub-frame 11 is attached to the main frame 10 by linkages 14 and 15. Linkages 15, which as shown in Figure 2 are provided at each side of the sub-frame, are pivotally attached at one end 21 to the sub-frame and pivotally attached at the other end 22 to the main frame. Linkages 14 are also provided at each side of the sub-frame 11. One end 23
of each linkage 14 is pivotally attached to the sub-frame 11, and the other end 24, which is shown in greater detail in Figure 3 is eccentrically, rotatably mounted by suitable bearing means 25 around rotatable shaft 26 which is in turn mounted for rotation on main frame 10 by bearing means 27. Rotatable shaft 26 is driven by motor 28 linked as shown by means of chain 29 to the cog wheel 30 mounted on the shaft. It will be apparent that sub-frame 11 is driven by motor 28 to reciprocably vibrate in the longitudinal direction thereof relative to the main-frame 10 by the eccentric mounting of linkage 14 on shaft 26.

Sub-frame 11 has mounted thereon a screen 31 comprising a plurality of longitudinally extending bars or rods 32, each bar or rod 32 being rotatably mounted at each end thereof on the sub-frame. Means 33 may also be provided to rotatably support the bars or rods 32 midway along the length thereof.

At one end of sub-frame 11 a feed chute 34 is preferably provided, chute 34 being mounted so as to feed onions fed thereto, for example by conveyor 35, onto the top of the screen 31. Longitudinally extending side members 36 and 37 are also provided to retain the onions on the screen 31 during reciprocation thereof.

As previously described, the screen 31 is vibrated or reciprocated in the longitudinal direction thereof in order to move onions fed thereon along the bars or rods 23 to a discharge end of the sub-frame 11 where the onions are discharged, for example onto conveyor 38.

As described above, sub-frame 11 is mounted on main frame 10 and the height of the screen 31 above blade members 16 and 17 adjusted so that the onion tops
and/or tails which project downwardly through screen 31 between bars or rods 32 thereof are cut off by the cutting edges of the blades. As previously described also, the blade members preferably also create a down draught to assist in turning the onions to this orientation.

In accordance with the present invention, Figure 4 illustrates in greater detail the means whereby rotation of the bars or rods 32 may be achieved in accordance with the present invention. As shown, each of the bars 32 is provided at one end with a toothed cog 41 which engages a driving chain 42. Chain 42 is itself driven by a main toothed drive wheel 43 which is coupled to motor 39 by linkage means 44. Linkage means 44 comprises a first radial arm 45 attached to drive wheel 43 and a second radial arm 46 attached to the output shaft 47 of motor 39. Pivotedly mounted between the free ends of the arms 45 and 46 is linkage member 48. As shown by the arrows in Figure 4, rotation of output shaft 47 of motor 39 causes reciprocating rotation of main drive wheel 43, which in turn causes reciprocating or "to-and-fro" rotation of the bars or rods 32 driven by chain 42.

Figure 5 illustrates an alternative means whereby rotation of the bars 32 may be achieved. As shown in this figure, each of the bars 32' other than the central bar (here designated as 40) is provided at one end thereof with a toothed cog 41' which engages a driving chain 42'. Chain 42' itself is driven by a main toothed drive wheel 43' coupled to motor 39. As will be apparent from the arrangement of chain 42' around the toothed cogs 41', on rotation of the main drive wheel 43' in the direction of arrow A (counter-clockwise), the bars 32' to the right of central bar 40 will be driven in the clockwise direction, while the
bars 32' to the left of central bar 40 will be driven counterclockwise.

In one further modification which may be made to the present invention, the bars or rods 32 may be disposed transverse to the generally longitudinal direction of the screen 31 that is, at right angles to the orientation shown in Figure 2. Of course, suitable mountings and drive means will be provided in this modification to enable rotation of the bars in accordance with this invention and in this modification the bars are preferably all driven in the same direction against the general movement of the onions along the screen 31.

Whilst the present invention has been described with reference to one particular embodiment thereof, and reference has been made to one particular modification thereof, it will be appreciated that further modifications and variations may be made to this particular embodiment without departing from the general scope of this invention as outlined above.
CLAIMS
The claims defining the invention are as follows:

1. A vegetable handling device comprising:
   - a main frame;
   - a screen mounted on said main frame, said screen comprising a plurality of spaced bars or rods;
   - means for reciprocally moving said screen relative to said main frame so as to move vegetables fed onto said screen at one end thereof towards the opposite end thereof;
   - at least one cutting blade rotatably mounted underneath and adjacent to said screen; and
   - means for rotatably driving said blade or blades;
   characterised in that at least some of said spaced bars or rods are mounted for rotation about their longitudinal axes, and means are provided to rotate said rotationally-mounted bars or rods.

2. A device according to claim 1, wherein the majority or all of said spaced bars or rods are mounted for rotation about their longitudinal axes.

3. A device according to claim 1 or claim 2, wherein said screen is generally rectangular and said means for reciprocally moving said screen moves said screen in the longitudinal direction of said bars or rods.

4. A device according to any one of claims 1 to 3, wherein said screen is mounted in a sub-frame and said sub-frame is mounted by mounting means in said main frame.

5. A device according to claim 4, wherein said mounting means includes linkage members which are
pivotally attached at one end to said sub-frame and pivotally attached at the other end to said main frame.

6. A device according to claim 5, wherein said mounting means further includes spring members extending between said main frame and said sub-frame.

7. A device according to any one of claims 4 to 6, wherein said means for reciprocally moving said screen includes a rotatable shaft mounted on said main frame, means to drive said rotatable shaft, and at least one linkage member, one end of which is eccentrically rotatably mounted around said shaft and the opposite end of which is pivotally attached to said sub-frame.

8. A device according to any one of claims 4 to 7, wherein all of said bars or rods are rotatably mounted in said sub-frame and said means for rotating said bars or rods comprises drive means arranged to reciprocally rotate said bars or rods.

9. A device according to claim 8, wherein each of said bars or rods is provided with a toothed cog at one end thereof, and said drive means comprises chain means in driving engagement with each of said toothed cogs, said chain means being driven by a main drive wheel, a first radial arm on said main drive means, a second radial arm on said output shaft, and a linkage member pivotally connecting the free ends of said first and said second radial arms whereby rotation of said output shaft by said motor causes reciprocating rotation of said main drive wheel and of said bars or rods.

10. A vegetable handling device according to
claim 1, substantially as herein described with reference to and as illustrated in the accompanying drawings.

11. The parts, elements, steps and features referred to or indicated in the specification and/or claims and/or drawings of this application, individually or collectively, and any and all combinations of any two or more of said parts, elements, steps or features.

Dated this 24th day of November, 1978.

GIULIANO LANZA, REGINA LANZA, ERMENEGILDO POLI, TAMARA POLI, MARIO CODEMO and ALVA CODEMO
By their Patent Attorneys,
DAVIES & COLLISON