

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Pineapple Peeling and Coring Machines

We, D. W. BINGHAM & COMPANY PROPRIETARY LIMITED, a company registered under the laws of the State of Victoria, and having its registered office at 224—238, Normanby Road, South Melbourne, in the State of Victoria, Commonwealth of Australia, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to pineapple peeling and coring machines of the type which include means whereby the skin of the pineapple is slit lengthwise and removed by a rotatable sleeve like knife from the flesh which is thus left in the form of a cylindrical slug still bearing part of the top and tail of the pineapple. This slug is fed through the rotating knife during the cutting operation and subsequently gravitates through a curved feed chute into one of a series of circumferentially spaced upstanding holders on a rotatable turret in which the slug is topped and tailed and subsequently carried under a coring tool.

Existing machines of the type indicated have proved to be unsatisfactory in several respects in that after having been cut the pineapple head on the slug frictionally engages the walls of the open ended passageway through the cutting head as well as the chute and undesirably impedes the passage of the slug therethrough. Thus, on occasions, synchronised feeding of the slugs to the holders in the turret is interrupted.

Another disadvantage is that the cut skins on occasions tend to curl up at the side of the cutting head and interfere with their removal for subsequent defleshing.

The primary object of the present invention is to provide an improved pineapple peeling and coring machine of the kind indicated which is adapted to overcome the

aforesaid objections in a relatively simple and practical manner.

Other objects and various novel constructional features of the improved machine will be more readily apparent from the following detailed description.

Apparatus in accordance with the present invention includes a stationary feed chute carrying a rotatable cutting head fitted with a sleeve-like knife, a series of spring influenced guide fingers located in advance of but adjacent to said sleeve-like knife, an endless conveyor for feeding pineapples lengthwise through said sleeve-like knife so as to cut a substantially cylindrical slug therefrom, a stationary knife located at one side of said cutting head, and extending substantially lengthwise thereof for splitting the skin of each pineapple as it is fed through the sleeve-like knife, pneumatic feeding means discharging through said guide fingers for assisting the forward movement of each pineapple through said cutting head, a part circular skin flattener for breaking the back of each split cylindrical pineapple skin whilst it is still upon said rotary cutting head and in engagement with said stationary knife, means for rotating said skin flattener in synchronism with the movement of said conveyor in such a manner that the working face of the part circular skin flattener is out of engagement with each pineapple as it is pushed forward by said conveyor through said sleeve-like knife, the skin of each pineapple being engaged by the skin flattener only after the cutting of said slug has been completed and a discharge chute for the flattened skins located adjacent to said stationary knife for the purpose specified.

But in order that this invention may be better understood reference will now be made to the accompanying sheets of drawings which are to be taken as part of this specification and read herewith:—



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Figure 1 is a perspective view of a pineapple peeling and coring machine in accordance with the present invention;

Figure 2 is a longitudinal section on an enlarged scale showing a rotatable cutting head and associated pineapple feeding means and the skin feeder for stripping the cut skins from the cutting head;

Figure 3 is an end view of the cutting head and the skin feeder taken on the line III—III of Figure 2;

Figure 4 is a cross-section taken on the line IV—IV of Figure 2;

Figure 5 is a longitudinal section on an enlarged scale of the cutting head and parts associated therewith seen in Figure 1;

Figure 6 is a fragmentary side elevation on an enlarged scale showing part of the main conveyor and means employed for actuating pneumatic feeding means associated with the rotatable cutting head;

Figure 7 is a cross-section taken on the line VII—VII of Figure 6;

Figure 8 is a sectional plan of part of the feed chute seen in Figure 5.

Pineapple peeling and coring machines of the kind indicated include an upstanding and stationary feed chute 2 which is detachably mounted upon the machine frame in such a manner that its lower end is adapted to register successively with each of a series of circumferentially spaced holders 3 on a rotary turret which is located beneath the chute. Each of these holders is adapted to receive a pineapple slug which is topped and tailed and then carried under any suitable type of coring tool.

The turret holders 3 and the associated coring tool are of a type which is well-known and the coring and the improved peeling mechanism are both adapted to be operated in synchronism from a common drive such as an electric motor (not shown) on the machine frame. The rotary turret and the coring tool may be actuated through the drive shaft 5.

Mounted upon the upper end of the chute is a rotatable cutting head 4 having an open ended longitudinal passageway therethrough communicating with the adjacent end of the chute. The cutting head is preferably mounted in anti-friction bearings 6 and actuated by gearing 7 or in any other suitable manner.

The rotary cutting head is mounted so that it is inclined upwardly and sidewardly in relation to the chute so that pineapple slugs passing through the cutting head will tend to gravitate therethrough as well as through the chute. The cutting head is provided at its outer end with a removable knife 8 which is of sleeve like form and of relatively thin walled construction whilst the adjacent outer surface of the cutting head is of truncated conical form as seen in Figure 5 so as to

strip the skin which has been cut lengthwise, from the slug in a known manner.

A power driven conveyor 9 is adapted to feed pineapples forcibly through the rotating knife and whilst so doing the skins are split lengthwise by a stationary knife 10 located at one side of the cutting head and extending lengthwise thereof.

In order to align the pineapple axially with the circular knife the pineapple is carried through a series of guide fingers 11 located immediately in advance of the sleeve like knife and which are arranged for example in four rows in diametrically opposed pairs around the conveyor. The fingers in each row are arranged one behind the other so that the row extends lengthwise of the conveyor.

The fingers are spring influenced, for example by coiled springs 12 as in Figure 2, in such a manner that their outer end portions which are of curved formation are normally pressed inwardly against the passing pineapple.

Each guide finger is pivotally mounted on a cross shaft 13 on any suitable supporting structure 14 and the pairs of opposed fingers are geared or otherwise operatively connected together as at 16 in such a manner that they move towards and away from each other in accordance with requirements.

In accordance with the present invention, the passage through the circular knife 8 may be of substantially parallel form near the outer end thereof and is then tapered outwardly towards its inner end so as to avoid any tendency to bind against the pineapple slug as it is being cut.

In addition, pneumatic feeding means are preferably provided for impelling the pineapple through the knife after the skin has been cut therefrom. In this case, provision is made whereby a series of circumferentially spaced air blasts impinge on the outer end of the cut pineapple within the knife and thus function to forcibly eject the pineapple from the knife and down the passageway through the cutting head forming part of the chute.

For this purpose, air under pressure is provided from any suitable type of compressor or pump (not shown) on the machine frame and delivered through any suitable pipes or passages 15 on the supporting structure 14 and through the cross shafts 13 to open ended discharge passages 17 extending lengthwise through some of the guide fingers 11 as seen more clearly in Figures 2 and 4 of the drawings.

For obvious reasons, it is desirable for the air blasts to be supplied intermittently, for example when the cutting of the pineapple skin has been completed, the air supplied being interrupted when the pineapple has passed through the cutting knife.

Suitable air control means are provided for



passing

this purpose. Such means include an automatic air control valve 18 mounted for example on the main frame of the machine and connected to the main air line leading from the air compressor. The air valve may be operated by a push rod 19 or the like having a bell-crank lever 21 associated therewith and which is adapted to be actuated by a series of longitudinally spaced strikers 22 on the pineapple conveyor.

It is customary for the conveyor 9 to carry a series of upstanding feed arms 23 for engaging the end of the pineapple so as to push it forwardly through the guide way towards the circular knife. For example, each of these arms may be provided with a striking surface 24 of predetermined length extending lengthwise of the conveyor and which is adapted to engage a complementary striking surface on the bell-crank lever 21 so that the latter is periodically rocked to open the air valve 18 and permit the delivery of air under pressure to the guide fingers in accordance with requirements.

The splitting knife 10 at the side of the cutting head is preferably inclined in relation thereto in such a manner as to serve the dual function of deflecting the split skin side-wardly in relation to the cutting head so that it will enter an associated discharge chute 26 leading to a known type of eradicator 27 for removing the flesh adhering to the skin in one or more stages.

In order to avoid any interruption of the feeding of pineapples to the cutting head in the event that choking of the skins should temporarily occur in the discharge chute, the latter is preferably provided with a hinged grid or other displaceable wall 28 overhanging and extending lengthwise of the open top of the chute which may be of substantially channel shape in cross section. This grid may include a series of laterally spaced rods 29 connected at their inner end to a cross bar 31 pivotally mounted for example, upon the eradicator housing. The grid may be spring influenced so as to normally hold it in its operative position and enable it to be readily displaced manually or otherwise for clearing the chute when required.

Associated with the cutting head is a skin flattener 32 adapted to strip the cylindrical skins from the cutting head after they have been removed from their slugs and split lengthwise. Normally these skins tend to retain their circular form but the improved skin flattener is adapted to break the back of the skins so that they are in a substantially flat state when they enter the discharge chute 26 leading to the eradicator. The working face of the skin flattener is of part circular form and may be carried by a support consisting of a pair of spaced plates fitted with a sleeve so that they may be mounted upon a rotatable shaft. The working

face of the skin flattener is preferably provided with a series of serrations or teeth 33 which may be arranged in rows so as to penetrate the pineapple skin when it is overlying the cutting head.

The shaft 34 of the skin flattener is carried by a bearing 36 which is preferably mounted upon a transverse pivotal support and spring influenced as at 37 in Figure 5 so that the working face of the skin flattener may be urged towards the cutting head. The space between the teeth of the skin flattener and the cutting head may be accurately adjusted by screw adjusting means or the like 38 so as to accommodate skins of varying thickness. The skin flattener shaft is power driver in any suitable manner and its speed is synchronised with that of the feeding conveyor in such a manner that the working face of the skin flattener is necessarily out of engagement with each pineapple as it is being pushed forward for cutting the slug, the skin being engaged by the flattener only after cutting of the slug has been completed.

In some cases, there is a tendency for the peeled pineapple, which however, has not yet been topped or tailed, not to slide freely through the inner end of the cutting head and around the usual curved passage 39 leading to the feed chute 2.

Any such interruption to the continuous feeding of the pineapples through the machine is of course most undesirable and in order to prevent such a situation developing the improved machine also preferably includes ejector means for positively feeding each pineapple around the curved passage leading to the chute. Such ejector means includes one or more pusher arms 41 which extend crosswise of the aforesaid curved passage and are adapted to travel lengthwise thereof behind each pineapple whereby the latter is positively pushed clear of the cutting head into the feed chute down which it is free to gravitate.

The pusher arm is preferably carried by an endless conveyor such as a chain 42 extending around a plurality of sprockets or pulleys 43 mounted upon any suitable type of supporting bracket or the like which is preferably located at one side of the curved passage the wall of which has a longitudinal open ended slot 44 formed in one side thereof so as to permit the pusher arm to freely enter and leave the passage after it has travelled lengthwise therethrough for an appropriate distance. The endless chain is power driven in any suitable manner and its movements are also necessarily synchronised with the main pineapple conveyor 9 and the rotatable skin feeder 32. If desired, the endless chain may be provided with an adjustable sprocket 46 to adjust its tension as desired.



According to another feature of the invention, a section 47 of the wall of the aforesaid curved passage is preferably formed separately and hingeably mounted as at 48 in its operative position so that it may be displaced when so desired to provide access to the curved passage 39 when necessary, for rapid clearance thereof.

It will be appreciated that if the pusher arm 41 projected outwardly on its carrier chain in such a manner that it extended radially when passing around the guide sprockets, its effective speed would be undesirably increased as it passed around such sprockets. To overcome this disadvantage, the pusher arm extends sidewardly in relation to its chain 42 so that its axis is substantially parallel with that of the supporting sprockets 43 which are mounted at one side of the curved passage 39 so that the pusher arm may extend transversely thereof. By this arrangement, the effective forward speed of the pusher arm remains substantially constant even when traversing the guide sprockets.

In use, pineapples are fed to the conveyor 9 which carries them forward tail first to the cutting head 4 whereupon the skin is cut in the form of a cylindrical casing from the pineapple to form the slug. Whilst being fed forward over the cutting head the splitting knife 10 cuts the skin lengthwise and when the cutting of the slug has been completed the split skin is engaged by the feeder 32 which functions to strip it from the rotating cutting head and break the back of the cylindrical skin whilst the latter is being fed sidewardly into the adjacent discharge chute 26 down which it slides for defleshing treatment.

The slug so formed is of substantially true cylindrical form and is effectively prevented by the aforesaid air blasts from sticking within the circular knife 8. The air blasts are desirably interrupted as aforesaid whilst the skin is being cut from oncoming pineapples.

Furthermore continuous feeding of the cut pineapples from the cutting head to the gravity chute is ensured by the aforesaid pusher arms 23. In the event that any unforeseen blockage should occur in the curved passage 39 leading to the gravity feed chute 2, this normally inaccessible passage may be quickly and easily cleared simply by opening the displaceable section 47 in the wall thereof.

The spring influenced and adjustable skin feeder 32 effectively flattens the skins whilst they are being fed to their discharge chute 26 and thus reduces the possibility of any choking occurring in that chute. However, if any such interruption does occur the chute may be quickly and easily cleared simply by swinging the chute grid 28 into its inoperative

position so that the accumulated skins in the chute may be readily removed.

Various alterations, modifications and/or additions may be introduced into the foregoing construction and arrangement of parts without departing from the ambit of the invention as defined by the appended claims.

WHAT WE CLAIM IS:—

1. An improved pineapple peeling and coring machine including a stationary feed chute carrying a rotatable cutting head fitted with a sleeve-like knife, a series of spring influenced guide fingers located in advance of but adjacent to said sleeve-like knife, an endless conveyor for feeding pineapples lengthwise through said sleeve-like knife so as to cut a substantially cylindrical slug therefrom, a stationary knife located at one side of said cutting head and extending substantially lengthwise thereof for splitting the skin of each pineapple as it is fed through the sleeve-like knife, pneumatic feeding means discharging through said guide fingers for assisting the forward movement of each pineapple through said cutting head, a part circular skin flattener for breaking the back of each split cylindrical pineapple skin whilst it is still upon said rotary cutting head and in engagement with said stationary knife, means for rotating said skin flattener in synchronism with the movement of said conveyor in such a manner that the working face of the part circular skin flattener is out of engagement with each pineapple as it is pushed forward by said conveyor through said sleeve-like knife, the skin of each pineapple being engaged by the skin flattener only after the cutting of said slug has been completed and a discharge chute for the flattened skins located adjacent to said stationary knife for the purpose specified.

2. An apparatus according to Claim 1 in combination with pineapple slug ejector means, portion of which extends transversely of said feed chute for assisting the discharge of said slugs from said feed chute for the purpose specified.

3. Apparatus according to either of Claims 1 or 2, wherein said guide fingers are located in advance of said sleeve-like knife and arranged in a series of rows located in circumferentially spaced relationship around the path of said oncoming pineapples with the fingers in each row extending lengthwise of said path, said guide fingers being pivotally mounted upon the machine frame in such a manner that the outer end portions of said fingers are pressed inwardly against the passing pineapples so as to yieldingly permit forward movement and oppose return movement thereof for the purpose specified.

4. Apparatus according to Claim 3, wherein said circumferentially spaced guide fingers are arranged in opposed pairs which are

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According to another feature of the invention, a section 47 of the wall of the aforesaid curved passage is preferably formed separately and hingeably mounted as at 48 in its operative position so that it may be displaced when so desired to provide access to the curved passage 39 when necessary, for rapid clearance thereof.

It will be appreciated that if the pusher arm 41 projected outwardly on its carrier chain in such a manner that it extended radially when passing around the guide sprockets, its effective speed would be undesirably increased as it passed around such sprockets. To overcome this disadvantage, the pusher arm extends sidewardly in relation to its chain 42 so that its axis is substantially parallel with that of the supporting sprockets 43 which are mounted at one side of the curved passage 39 so that the pusher arm may extend transversely thereof. By this arrangement, the effective forward speed of the pusher arm remains substantially constant even when traversing the guide sprockets.

In use, pineapples are fed to the conveyor 9 which carries them forward tail first to the cutting head 4 whereupon the skin is cut in the form of a cylindrical casing from the pineapple to form the slug. Whilst being fed forward over the cutting head the splitting knife 10 cuts the skin lengthwise and when the cutting of the slug has been completed the split skin is engaged by the feeder 32 which functions to strip it from the rotating cutting head and break the back of the cylindrical skin whilst the latter is being fed sidewardly into the adjacent discharge chute 26 down which it slides for defleshing treatment.

The slug so formed is of substantially true cylindrical form and is effectively prevented by the aforesaid air blasts from sticking within the circular knife 8. The air blasts are desirably interrupted as aforesaid whilst the skin is being cut from oncoming pineapples.

Furthermore continuous feeding of the cut pineapples from the cutting head to the gravity chute is ensured by the aforesaid pusher arms 23. In the event that any unforeseen blockage should occur in the curved passage 39 leading to the gravity feed chute 2, this normally inaccessible passage may be quickly and easily cleared simply by opening the displaceable section 47 in the wall thereof.

The spring influenced and adjustable skin feeder 32 effectively flattens the skins whilst they are being fed to their discharge chute 26 and thus reduces the possibility of any choking occurring in that chute. However, if any such interruption does occur the chute may be quickly and easily cleared simply by swinging the chute grid 28 into its inoperative

position so that the accumulated skins in the chute may be readily removed.

Various alterations, modifications and/or additions may be introduced into the foregoing construction and arrangement of parts without departing from the ambit of the invention as defined by the appended claims.

WHAT WE CLAIM IS:—

1. An improved pineapple peeling and coring machine including a stationary feed chute carrying a rotatable cutting head fitted with a sleeve-like knife, a series of spring influenced guide fingers located in advance of but adjacent to said sleeve-like knife, an endless conveyor for feeding pineapples lengthwise through said sleeve-like knife so as to cut a substantially cylindrical slug therefrom, a stationary knife located at one side of said cutting head and extending substantially lengthwise thereof for splitting the skin of each pineapple as it is fed through the sleeve-like knife, pneumatic feeding means discharging through said guide fingers for assisting the forward movement of each pineapple through said cutting head, a part circular skin flattener for breaking the back of each split cylindrical pineapple skin whilst it is still upon said rotary cutting head and in engagement with said stationary knife, means for rotating said skin flattener in synchronism with the movement of said conveyor in such a manner that the working face of the part circular skin flattener is out of engagement with each pineapple as it is pushed forward by said conveyor through said sleeve-like knife, the skin of each pineapple being engaged by the skin flattener only after the cutting of said slug has been completed and a discharge chute for the flattened skins located adjacent to said stationary knife for the purpose specified.

2. An apparatus according to Claim 1 in combination with pineapple slug ejector means, portion of which extends transversely of said feed chute for assisting the discharge of said slugs from said feed chute for the purpose specified.

3. Apparatus according to either of Claims 1 or 2, wherein said guide fingers are located in advance of said sleeve-like knife and arranged in a series of rows located in circumferentially spaced relationship around the path of said oncoming pineapples with the fingers in each row extending lengthwise of said path, said guide fingers being pivotally mounted upon the machine frame in such a manner that the outer end portions of said fingers are pressed inwardly against the passing pineapples so as to yieldingly permit forward movement and oppose return movement thereof for the purpose specified.

4. Apparatus according to Claim 3, wherein said circumferentially spaced guide fingers are arranged in opposed pairs which are



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operatively connected together for the purpose specified.

5. Apparatus according to either of Claims 3 or 4, wherein air passages are provided on that part of the machine frame supporting the said guide fingers, said air passages communicating with discharge passages extending lengthwise through some or all of said guide fingers in such a manner that when in use a series of circumferentially spaced air blasts impinge on the outer end portion of each pineapple slug whilst it is within said sleeve like knife for the purpose specified.

6. Apparatus according to Claim 5 in combination with an automatic air valve for controlling the delivery of air to said guide fingers, said valve being adapted for operation by a series of longitudinally spaced strikers on the conveyor or other means employed for feeding said pineapples lengthwise through said sleeve like knife for the purpose specified.

7. Apparatus according to any one of the foregoing claims wherein said stationary knife is inclined lengthwise of said cutting head in such a manner as to serve the dual purpose of cutting each pineapple skin lengthwise and also deflecting the split skin side-wardly in relation to said cutting head so that it will enter said discharge chute for the purpose specified.

8. Apparatus according to any one of the foregoing claims wherein said discharge chute for each pineapple skin is provided with a hinged grid overhanging and extending lengthwise of the normally open top of said chute which is of substantially channel shape in cross section, said grid including a series of longitudinally spaced rods connected at their inner end to a cross bar pivotally mounted upon said discharge chute or an associated eradicator housing for the purpose specified.

9. Apparatus according to any one of the foregoing claims wherein said skin flattener is mounted upon a rotatable shaft carried by a bearing on a transverse pivotal support which is spring influenced so that the working face of said skin flattener is urged towards said cutting head, and means for adjusting the operative position of the working face of said skin flattener in relation to the side of said cutting head, said working face being provided with a series of serrations or teeth arranged in rows so as to penetrate each pineapple skin when it is overlying said cutting head for the purpose specified.

10. Apparatus according to any one of the foregoing Claims 2-9, wherein said ejector means includes one or more pusher arms extending cross wise of the passage through said feed chute and each of which is carried by an endless conveyor located at one side of said feed chute, a longitudinal open ended slot formed in one side of the wall of said

feed chute so that each pusher arm extends laterally through said slot for the purpose specified.

11. Apparatus according to Claim 10 wherein a section of the wall of said stationary feed chute is formed separately and hingeably mounted in position upon the adjacent part of said feed chute so as to define part of said slot, said wall section being displaceable for the purpose specified.

12. An improved pineapple peeling and coring machine including a stationary feed chute carrying a rotatable cutting head fitted with a sleeve like knife, said feed chute having a curved portion leading to the discharge end of the chute, said chute having a displaceable section forming part of said curved portion of the chute and/or which is hingeably mounted upon the adjacent portion of the chute wall so as to define part of an open ended slot extending lengthwise through part of said curved portion and the discharge end portion of said feed chute, slug ejector means mounted upon said feed chute and having one or more pusher arms carried by an endless chain and which extend transversely of said feed chute in such a manner as to pass lengthwise through said slot, an endless conveyor for feeding pineapples to said cutting head, a series of spring influenced guide fingers arranged in a series of rows which are circumferentially spaced around said endless conveyor adjacent to said cutting head, the guide fingers in said rows being arranged in opposed pairs which are geared together in such a manner as to yieldingly engage the sides of each pineapple as it is carried forward by the conveyor and to oppose any return movement of said pineapples, some of said guide fingers having air passages formed therethrough and which are in communication with an air pump or other compressed air source of supply so as to provide when in use, a series of air blasts impinging upon the adjacent end of each pineapple as it passes through said sleeve like knife, a stationary knife located at one side of said cutting head and extending substantially lengthwise thereof for splitting the skin of each pineapple as it is fed through the sleeve like knife, a skin flattener for breaking the back of the split cylindrical skin from each pineapple and which is of part circular formation having a series of teeth on its working face and which is carried by a rotatable shaft in a bearing located on a pivotal mounting and which is spring influenced and provided with screw adjustment means for varying the operative position of said working face in relation to said cutting head and a discharge chute located adjacent to said stationary knife and having a side wall which is displaceable for the purpose specified.

13. An improved pineapple peeling and

coring machine consisting in a combination and arrangement of parts constructed and adapted to function substantially as described with reference to the accompanying drawings.

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