June 10, 1930. F. HAMACHEK 1,762,225

SCREEN DRUM FOR GREEN PEA VINE HULLERS

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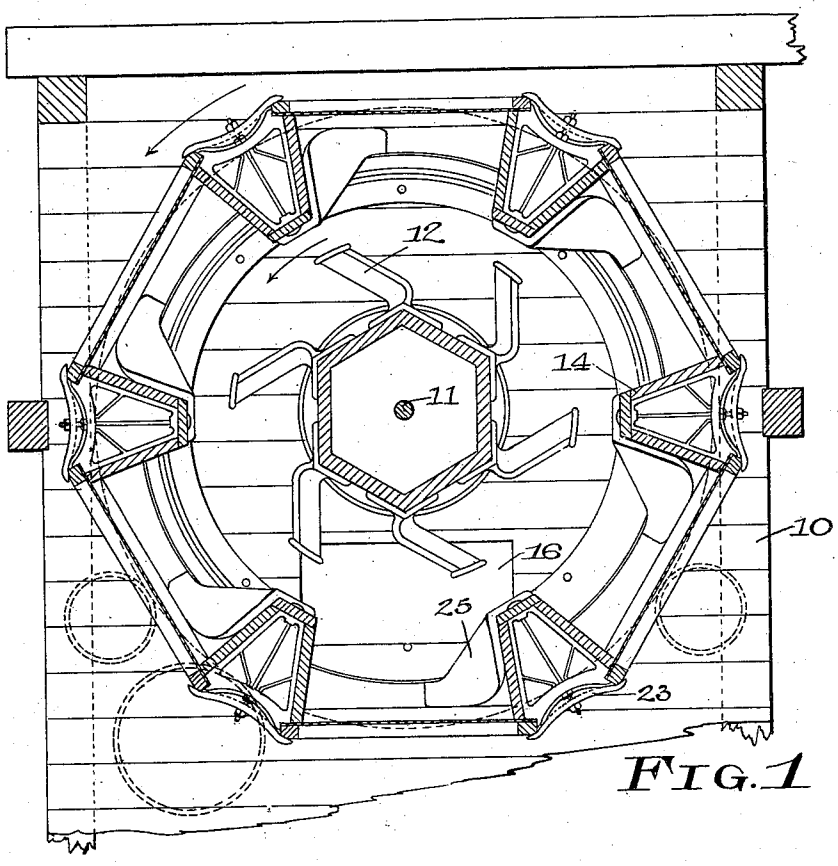
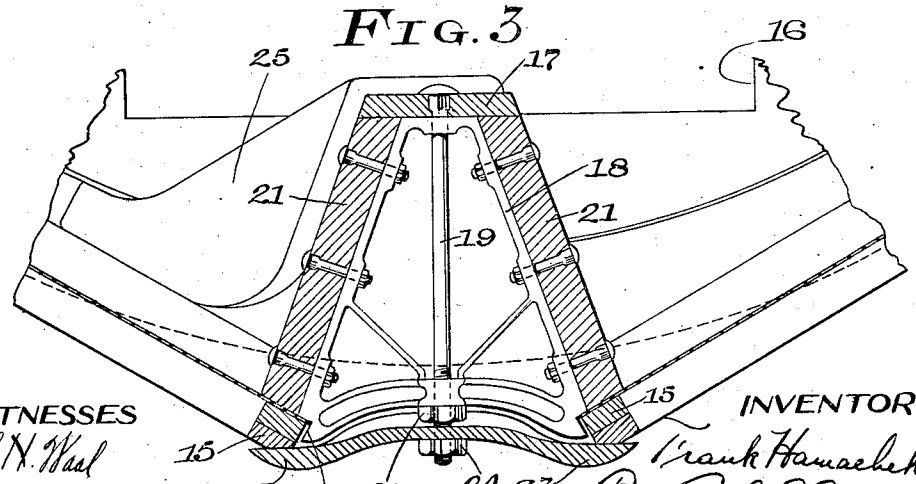


FIG. 1

FIG. 3



WITNESSES
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SCREEN DRUM FOR GREEN PEA VINE HULLERS

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FIG. 2

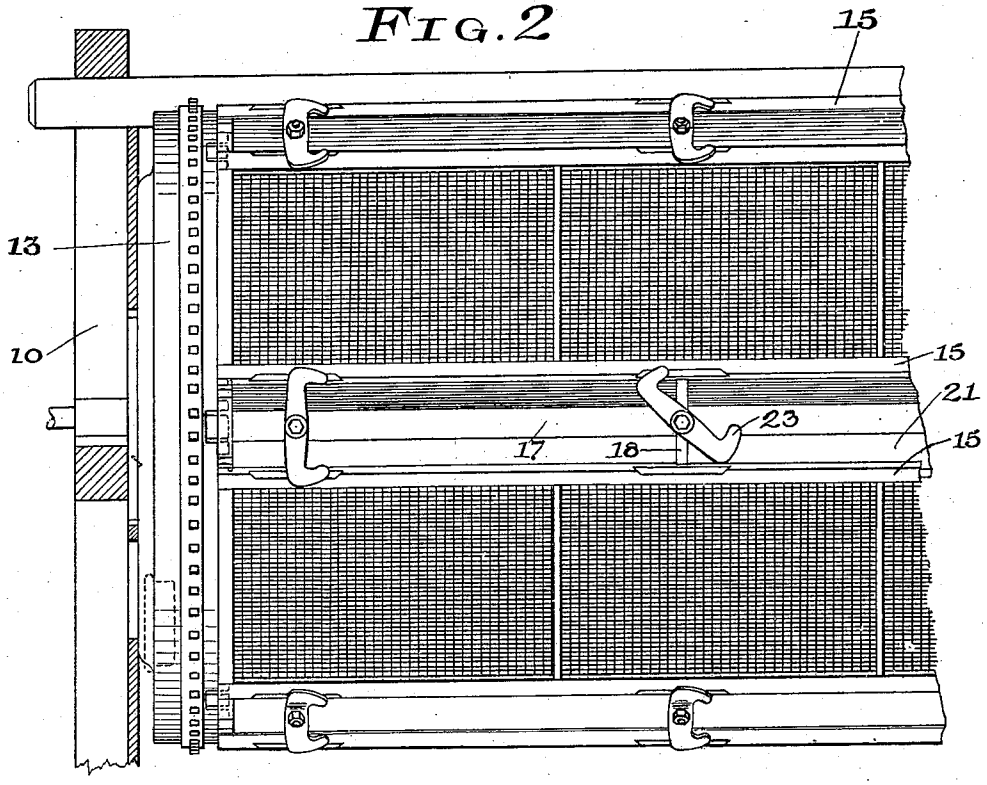


FIG. 4

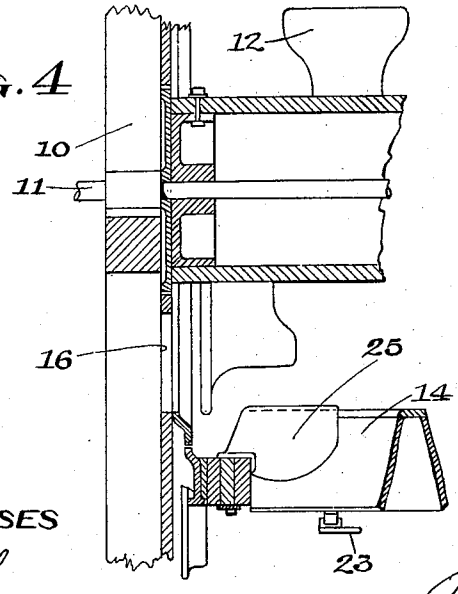
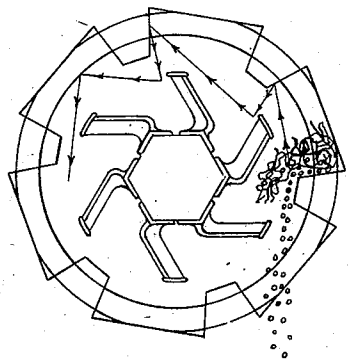


FIG. 5



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UNITED STATES PATENT OFFICE

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SCREEN DRUM FOR GREEN-PEA-VINE HULLERS

Application filed January 18, 1924. Serial No. 687,037.

This invention relates to green pea vine hullers and has for its object to provide a screen drum, which, in its co-operation with the rotating beaters within it, serves to reduce the tangled masses of vines to a greater extent than has been possible with screen drums as ordinarily constructed.

Another object of the invention is to provide the screen drum with lifting ribs inclined with respect to their direction of rotation, whereby the material will be dropped from them earlier in the cycle of operation or at a lower point in the drum, where liberated peas will fall upon the screen surface of the drum and so be given an opportunity to pass out of the drum without injury by the beaters.

Another object of the invention is to advance the timing of the discharge of material from the lifting ribs in this manner so as to facilitate the action of the beaters in disentangling the bunches of vines, whereby the pods in the interior of the bunches are made more readily accessible to the opening action of the beaters.

Another object of the invention is to prolong the duration of the disentangling action of the beaters by the slower discharge of the vines from the lifting ribs.

Another object of the invention is to perfect details of construction of the screen drum, giving it strength and accessibility.

Another object of the invention is to make a more sanitary machine by providing a more open angle between the screens and the lifting ribs and so avoid the angular pockets that are formed with the ordinary straight lifting ribs, thus avoiding the accumulation of dirt.

With the above and other objects in view the invention consists in the screen drum for green pea viners as herein claimed and all equivalents.

Referring to the accompanying drawings in which like characters of reference indicate the same parts in different views,

Fig. 1 is a transverse sectional view of a portion of a green pea viner showing the screen drum constructed in accordance with this invention and the relation of the beaters thereto;

Fig. 2 is an outside view of one end of the screen drum;

Fig. 3 is a transverse sectional view through one of the lifting ribs;

Fig. 4 is a longitudinal sectional view at one end of the screen drum, and

Fig. 5 is a diagram showing the path of travel of loose peas discharged from a lifting rib and the path of travel of vines struck by the beaters.

In these drawings, 10 indicates the machine frame, in which is journaled the shaft 11 carrying the beaters 12 as usual. Surrounding the beaters is a screen drum mounted on supporting rollers and driven as usual in the same direction as the beaters but at a slower speed. The drum consists of end rings 13, which are connected together by regularly spaced lifting ribs 14 which form supports for rectangular screen frames 15 covered with screen material. The vines in bunches as harvested from the field are fed to the drum through an opening 16 in the casing at the end of the drum and, falling onto a screen between the lifting ribs, are carried upwardly on the lifting ribs and discharged in the path of the beaters, the blows of which against the pods cause the pods to open and liberate the peas. The loose peas pass out of the drum through the screen surfaces thereof and fall upon a separating apron, not shown.

Heretofore lifting ribs have been usually arranged in a radial plane whether they were of solid board construction or of more or less open construction, but in the present invention the lifting surface of the lifting rib 14 is inclined with respect to a radial plane, causing it to reach a discharge angle at a lower portion of the drum. This not only serves to produce the stream of falling loose peas beyond the reach of the beaters so that they will not be struck by the beaters and bruised, but it gives an earlier start to the action of the beaters in reducing the bunches of vines by their engagement with the outer portions of the bunches and consequently the action of reducing the bunches is more thorough and complete.

The lifting rib 14 is preferably made with its rear surface inclined also but in the opposite direction so as to produce a symmetrical form and a convenient construction is shown in detail in Fig. 3, wherein an inner board 17 is clamped to a series of triangular metal frames 18 by a bolt 19 having a nut 20 threaded thereon and the inclined opposite faces of the lifting rib are formed by boards 21 bolted to the diverging side edges of said frames.

The screen frames 15 bear on the edges of the boards 21 and fit in notches 22 of the frames 18, where they are held by clamping members 23, which bridge across the lifting rib and engage both of the screen frames fitting thereon. These clamping members are mounted on the bolts 19 and are held in their clamping engagement by means of nuts 24 threaded on the bolts, but as they are of a U-shape, as shown in Fig. 2, they are capable of being partly turned so as to release either screen frame without releasing the other, according to whether they are given a partial turn to the right or to the left. If given a full quarter turn they release both frames. At the receiving end of the screen drum where the beaters are longer each lifting rib is provided with a blow-deflecting guard 25 as covered in my Patent 1,405,914, dated February 7, 1922.

In operation the bunches of vines as harvested are fed to the machine through the feed opening 16 in the end wall of the housing, where they are caught by the end beaters and the lifting ribs and are more or less strung out to effect a preliminary separation or reduction that will give better access to the peas. Thereafter the vines, still bunched to some extent, are lifted by the inclined front walls of the lifting ribs and are fed gradually into the path of the beaters, which further reduces the size of the bunches and exposes the pods to the blows of the beaters to open them and liberate the peas. Vines sliding off of the lifting ribs and struck by the beaters will be thrown upwardly against the inclined rear walls of the preceding lifting ribs and will fall back to be again struck by the beaters so that they may be struck repeatedly before they succeed in passing over the beater drum, thus increasing the effectiveness of the vine-bunch-reducing and the pod-opening operations.

The inclined front walls of the lifting ribs cause the loose peas to roll off at a lower elevation than with the ordinary radial lifting ribs, so that the stream of falling peas is beyond the reach of the beaters and the peas fall on the screen surface of the next screen frame, as indicated in the diagram Fig. 5. Thus the loose peas are protected to a large extent from the bruising action of the beaters both by the avoidance of their being dropped in the path of the beaters and by their dropping on the screen surface so that they have opportunity to leave the drum at once.

Furthermore, the inclination of the front wall of the lifting rib causes the vines carried thereon to start to slide off at a much lower point than when radial ribs are used and consequently the vines project into the path of the beaters where the beaters are traveling upwardly with the result that the vines are given a repeated gentle jostling or juggling action, shaking the peas therefrom and increasing the opportunity for the beaters to strike and open the pods. Furthermore, the vines slide off of the inclined lifting rib gradually so that successive portions are exposed to the blows of the beaters and consequently the untangling of bunches of vines is further promoted and this reduction of the tangled bunches of vines is of extreme importance in a machine of this character for the efficiency of the operation depends upon it. Such peas as pass through a viner unopened are usually those protected from the action of the beaters by a surrounding mass of vines. Contrasted with this the operation of the common radial lifting rib is such that it carries the vines to a position above the beater drum before they begin to slide off and then meet with the beaters where they travel in more nearly a horizontal direction so that the bunch as a whole is thrown laterally across the drum without materially reducing it and without subjecting the peas to the repeated action of the beaters.

In actual practice it is found that the inclination of the lifting surface with respect to the axial plane and the retarded release of vines resulting therefrom causes the vines to be stretched across the gap between the lifting surface and the beaters where the loose peas have an opportunity to drop through and be discharged and affords an opportunity for a greater number of pod-opening blows to be struck by the beaters.

The direction of travel of the vines resulting from the blow of the beaters and the centrifugal action to which they are subjected is such as to have them land against an inclined surface of the lifting rib instead of against a radial plane and consequently they receive a glancing blow instead of a bruising blow.

The inclined rear surface of the lifting rib prevents the formation of a pocket in which the vines might be held by centrifugal force and retarded in their dropping action.

The lower position for the first dropping of the vines by the inclination of the lifting rib causing the blow received by the vines when hit by the beaters to take place earlier in the cycle of operation results in loose parts being thrown against the inclined rear surface of the preceding lifting rib and then falling in a position to be struck again by a beater and again thrown against a lifting rib before reaching a point beyond the range

of the beater and in this manner effecting as many as three successive blows before the loose parts pass entirely over the beater drum, as indicated in the diagram Fig. 5, and, of course, the greater number of blows struck increases the efficiency of the pea-hulling operation.

The gradual discharge of vines from the inclined lifting ribs increases the number of engagements of the beaters with the vines and tends to drag the vines out and disentangle them from the bunches in which they are fed to the machine so that these bunches are progressively broken down or reduced and, while there is a tendency to rebunch at the bottom of the machine, the succeeding action of separating such bunches becomes easier to perform and less trouble is caused from bunching as the vines progress through the machine.

The lifting ribs of this invention are of simple construction but add great strength and rigidity to the drum and facilitate cleaning, while the simple clamping mechanism for securing the screen frames in place permits of quick access to the interior of the drum and enables one screen frame to be removed without disturbing the others.

The lifting rib with inclined front face in accordance with this invention, not only makes the machine more sanitary, for the reasons hereinbefore mentioned, but for the further reason that the angle formed between the lifting rib and the screens is more open than with the ordinary straight lifting rib and so avoids the formation of angular pockets between the ribs and the screen in which dirt may accumulate. The open angle furthermore facilitates the cleaning operation.

It will be apparent that some of the benefits of the present invention may be obtained by inclining the front face only of the lifting rib and, while such constructions are covered by the claims mentioning only the front or lifting faces of the ribs, the construction as shown is preferred.

Throughout this case the mention of the inclination of the front face of the lifting rib serving to cause the loose peas to fall before they are positioned above the beaters has reference to the fact that the stream of peas as shown in Fig. 5 is beyond the path of travel of the beaters.

Throughout the specification and claims of this case the term "green pea vine hullers" is used with its broader meaning to include machines used for hulling lima beans and other suitable crops as the invention is not confined to the use with green peas.

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

1. In a green pea vine huller, a screen drum, beaters rotatable therein, and lifting ribs within the drum with their lifting surfaces inclined rearwardly from their outer edges in order that loose peas may roll off therefrom before reaching a position above the beaters.

2. In a green pea vine huller, a screen drum, beaters rotatable therein, and means for subjecting vines repeatedly to the blows of the beaters comprising lifting ribs along the inner walls of the drum with their lifting faces deflected rearwardly from the surface of the drum.

3. In a green pea vine huller, a screen drum, beaters rotatable therein, and means for subjecting vines repeatedly to the blows of the beaters in each cycle of operation comprising lifting ribs along the inner walls of the drum having their front faces inclined rearwardly and their rear faces inclined forwardly.

4. In a green pea vine huller, a screen drum, beaters rotatable therein, and means for subjecting vines repeatedly to the blows of the beaters to open the pods without undue bruising of peas consisting of lifting ribs extending along the inner walls of the drum with their front faces inclined rearwardly from their outer edges to discharge loose peas before they are positioned above the beaters and to expose vines to the action of the beaters where the beaters move upwardly.

5. In a green pea vine huller, a screen drum, beaters rotatable therein, and means for subjecting vines repeatedly to the blows of the beaters to open the pods without undue bruising of peas consisting of lifting ribs extending along the inner walls of the drum with their front faces inclined rearwardly to discharge loose peas before they are positioned above the beaters and to expose vines to the action of the beaters where the beaters move upwardly, said lifting ribs having forwardly inclined rear faces against which the vines may be thrown by the beaters to receive a glancing blow deflecting them back to the path of the beaters.

6. In a green pea vine huller, a screen drum, beaters rotatable therein, and lifting ribs extending along the inner walls of the drum comprising boards arranged at an angle to each other to form surfaces inclined with respect to an axial plane from one end of the drum to the other.

7. In a green pea vine huller, a screen drum, beaters rotatable therein, and lifting ribs extending along the inner walls of the drum comprising boards arranged at an angle to each other, inner boards connecting their inner edges, screen frames fitting along their outer edges, and clamping means for securing the screen frames in place.

8. In a green pea vine huller, a screen drum, beaters rotatable therein, lifting ribs extending along the inner walls of the drum comprising triangular frames, boards secured to the converging inner edges of the frames, clamping members secured to the outer edges

of the frames, and screen frames fitting against the outer edges of the boards and held in place by means of the clamping members.

9. In a green pea vine huller, a screen drum, beaters rotatable therein, lifting ribs along the inner walls of the drum comprising triangular frames, pairs of boards secured to the converging inner edges of the triangular frames, inner boards fitting against the inner edges of the pairs of boards, screen frames fitting against the outer edges of the pairs of boards, bolts connecting the inner boards with the frames, clamping members pivotally mounted on said bolts, clamping nuts threaded on the bolts for securing the clamping members against the screen frames.

10. In a green pea vine huller, a screen drum, beaters rotatable therein, lifting ribs extending along the inner walls of the screen drum, screen frames fitting against the edges of the lifting ribs, and pivotally mounted clamping members on the lifting ribs having eccentrically positioned pivotal points whereby a partial turn thereof in either direction will release one screen frame without releasing the other.

11. In a lifting rib for screen drums of green pea vine hullers, a frame member having oppositely inclined edges, a pair of boards secured to said edges, an inner board connecting the edges of said boards, a bolt passing through the inner board and the frame, a nut threaded on the bolt for clamping the parts together, screen frames fitting against the outer edges of the pair of boards, shoulders on the frames forming abutments for the screen frames, a clamping member pivotally mounted on the bolt and engaging the edges of the screen frames, and a nut threaded on the bolt for securing the clamping member in place.

12. In a green pea vine huller, a screen drum, beaters rotatable therein, and inwardly extending lifting ribs within the drum with their lifting faces inclined rearwardly with respect to a radial plane.

13. In a green pea vine huller, a screen drum, beaters rotatable therein, lifting ribs extending along the inner walls of the screen drum, screen frames fitting against the edges of the lifting ribs, and pivotally mounted clamping members on the lifting ribs, said clamping members being of a U-shape whereby a partial swinging movement thereof in either direction will release one screen frame without releasing the other.

In testimony whereof, I affix my signature.

FRANK HAMACHEK.