Oct. 21, 1947. H. M. CARTER ET AL 2,429,343

PEANUT CLEANER CONSISTING OF GASEOUS SUSPENSION AND SIFTING MEANS

Filed Oct. 30, 1944 2 Sheets-Sheet 1

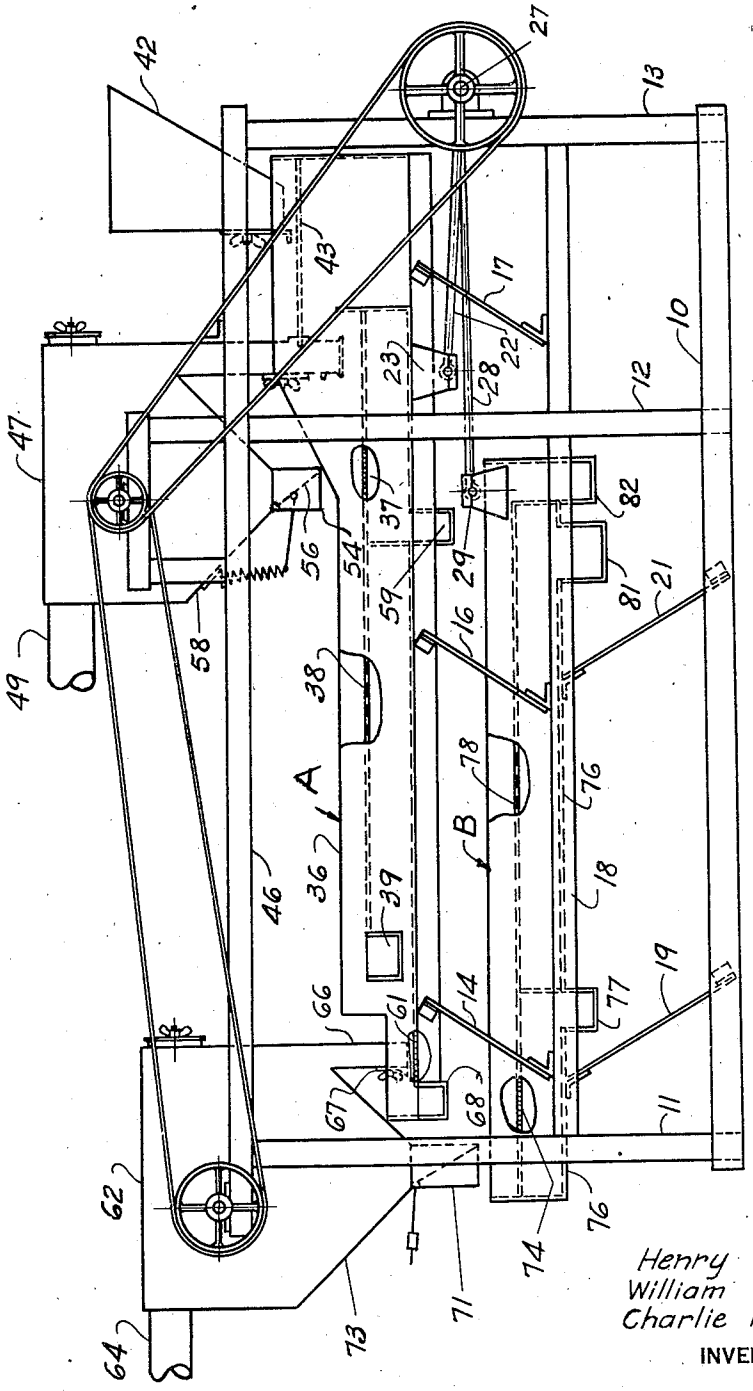


Fig.-1

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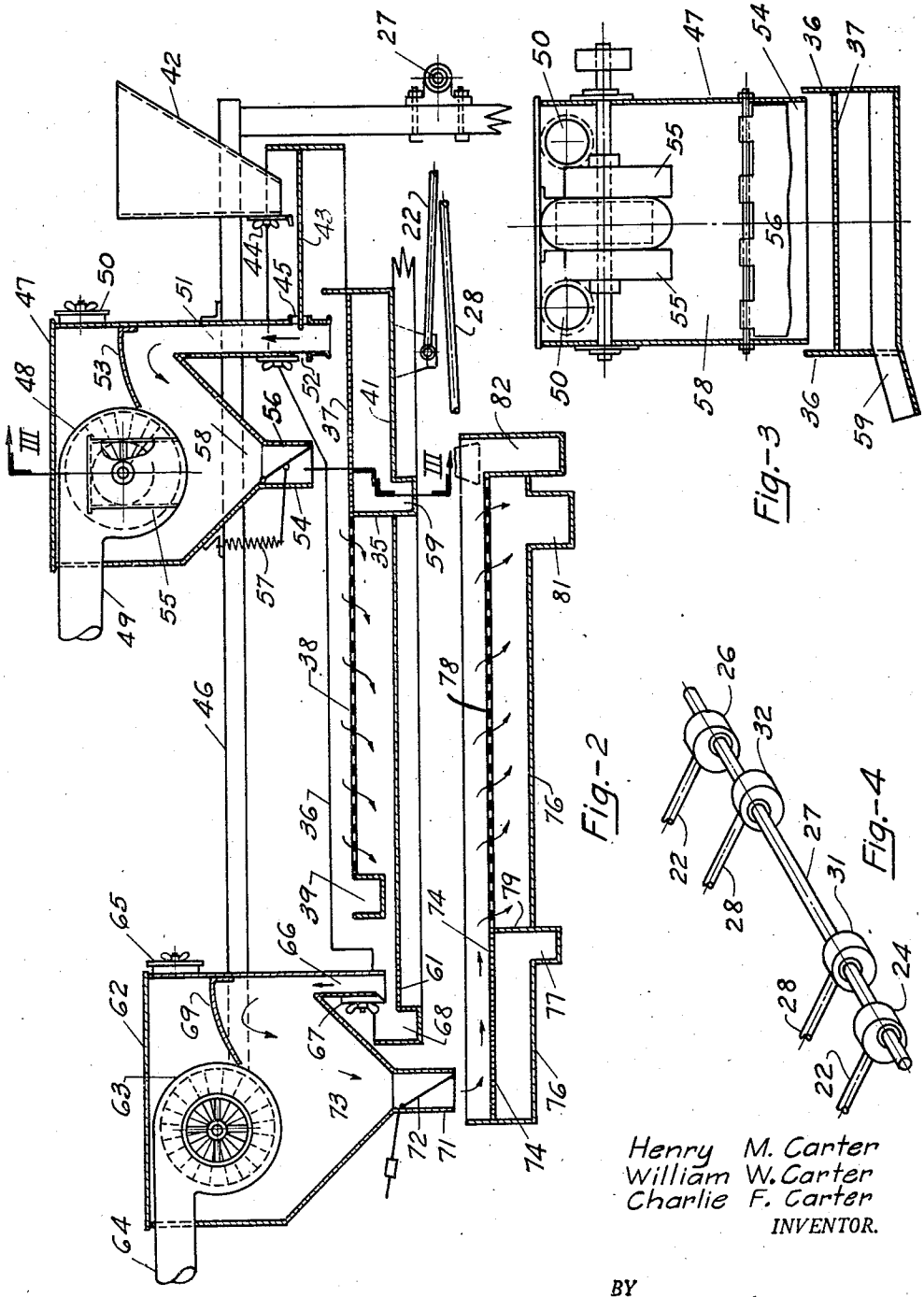


Fig.-2

Fig.-3

Fig.-4

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PEANUT CLEANER CONSISTING OF GASEOUS SUSPENSION AND SIFTING MEANS

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5 Claims. (Cl. 209—21)

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Our invention relates to an improvement in cleaners for peanuts and the like, and has for an object the provision of a cleaner which shall be capable of removing from a moving mass of peanuts foreign matter, such as sticks, leaves, stones, fine sand and light trash, all of which are generally present in peanuts as they come from the field.

A further object to our invention is to provide a cleaner of the character described which embodies a pneumatic cleaning unit associated with a perforated surface in such manner that a mass of the product being cleaned is simultaneously subjected to both pneumatic and mechanical cleaning; the light foreign matter, such as dust and small trash, being removed by the pneumatic treatment, and the heavier small particles of foreign matter, such as fine rocks and sand, and large lighter particles, such as sticks, being removed by the mechanical treatment.

Our invention further comprises the provision of a plurality of pneumatic separating chambers into which the peanuts and lighter constituents of the foreign matter are successively drawn by suction, leaving the heavier materials on the screen, the lighter material being discharged from the pneumatic separating chambers and the peanuts deposited again on the screen.

Our invention further comprises the provision of a plurality of superposed screening units so associated with each other as to minimize the amount of space required thereby, so that the machine is very compact, light in weight, and efficient.

Heretofore, it has been the practice in cleaning peanuts when first picked and mixed with sand, rocks, sticks and light trash to pass them over a screen for the purpose of removing sand, fine particles of stone, and large bodies of foreign matter, such as sticks and large stones. However, so far as we are aware, no machine has yet been devised which is capable of removing all of the foreign matter generally present in peanuts, such as, for instance, sand, small rocks, sticks, leaves and the like. More particularly, we are not aware that any machine heretofore devised has been capable of removing stones which are approximately equal in size with the peanuts or other similar values. It will readily be seen that mere screening is not capable of doing so, for those stones which are substantially equal in size to the values will not be retained on a screen having openings of such size as to pass the values, and the values will not be retained on a screen whose openings are large enough to pass the stones. In cleaning peanuts, such stones have heretofore been removed after shelling by spreading the mixed peanuts and stones on a moving conveyor belt and picking out the stones by hand.

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Briefly, our invention comprises a plurality of reciprocable, perforated deck sections which are arranged in superposed relation, with the peanuts treated on one section being delivered for subsequent treatment onto the next lower screen section, together with a plurality of pneumatic separating units associated with the screens which are adapted to lift the peanuts and lighter trash off the screen and separate the lighter trash from the peanuts pneumatically and return the peanuts to the screen for the shaking and screening treatment. In the screening treatment, the fine sand and heavier constituents of the mixture are screened out through a relatively fine screen portion through which the peanuts cannot pass. The peanuts are then passed through a screen having openings sufficiently large for the purpose, leaving the sticks and larger trash on that screen. Between the treatments just described, the peanuts and lighter trash are picked up bodily off the screen by one of the suction units and the lighter trash separated from the peanuts pneumatically, returning the peanuts to the screen. The combined screening and pneumatic treatment just described is repeated in the subsequent section, or sections, and the peanuts finally discharged, free of sand, rocks, and other trash which accompanies them from the field.

Apparatus embodying features of our invention is illustrated in the accompanying drawings, forming a part of this application, in which

Fig. 1 is a side elevational view with certain parts in section;

Fig. 2 is a somewhat diagrammatic transverse sectional view illustrating the operation of our improved cleaner;

Fig. 3 is a sectional view taken along the line III—III of Fig. 2; and

Fig. 4 is a fragmental perspective view of the eccentrics for effecting reciprocating motion and illustrating the preferred manner of setting the same on the driving shaft.

Referring now to the drawings for a better understanding of our invention, our improved apparatus comprises frame work including a base 10 and uprights 11, 12 and 13. Supported from the framework are upper and lower sections A and B. The upper section A is supported by means of the usual limber jims 14, 16 and 17, which are secured at their lower ends to a horizontal frame member 18. The limber jims 14, 16 and 17 are rearwardly

inclined from the top downwardly so that when the section is reciprocated, material travels rearwardly thereover. The section B is likewise supported on limber jims 19 and 21, secured at the bottom to the base member 10 and which are forwardly inclined from the top downwardly to cause material to travel forwardly thereover. The upper section A is reciprocated, or shaken, by means of connecting rods 22, suitably coupled to the screen at 23, and at their forward ends to eccentrics 24 and 26, mounted on a shaft 27. The section B is reciprocated by means of connecting rods 28, coupled to the section B at 29, and at their forward ends to eccentrics 31 and 32, mounted on the shaft 27. It will be noted by reference to Fig. 4 that the eccentrics 31 and 32 are set at angles of 180° relative to the eccentrics 24 and 26. By this means, the movements of the sections A and B are always opposite to each other and vibration is thereby greatly minimized.

The section A comprises side walls 36 between which is mounted a relatively short, relatively fine screen 37, for sand and other relatively heavy fine particles. Rearwardly of the fine screen 37 is a coarser screen 38 having openings therein large enough for peanuts to pass through. Beneath the screens 37 and 38 is a floor 41 and a partition 35 divides the space beneath said screens. In operation peanuts pass through the screen section 38 onto the floor 41, leaving the sticks and larger size trash on the screen from whence they are delivered at the rearward end by a delivery spout 39.

Located at the forward end of the screen section A is a feed hopper 42 mounted over a feed plate 43. An adjustable gate 44 regulates the distance or amount of opening between the feed hopper 42 and the plate 43, and thus regulates the rate of feed of peanuts from the hopper 42. Mounted on an upper horizontal frame member 46, over the fine screen 37, is a pneumatic separating unit 47. The separating unit 47 comprises a rectangular casing having a suction fan 48 mounted wholly therein, and discharging through an outlet 49 outside the casing. Downwardly opening lateral conduits 55 span the inlet openings of the fan 48 and extend downwardly to the lower periphery of the fan casing to insure separation of the light trash from the peanuts. At the forward end of the casing is a suction conduit 51 which extends entirely across section A. The feed plate 43 extends through an opening 45 in the side of the conduit 51 and delivers peanuts thereinto. An adjustable opening 52, near the lower end of the conduit 51, controls the admission of air into the conduit and thus regulates the character of material sucked up through conduit 51. The strength of the suction through the conduit 51 may be further regulated by means of a damper 50 in the upper part of the casing. Within the casing 47, attached to the forward wall thereof, is a baffle member 53 for directing heavier particles downwardly into a settling hopper 58, located rearwardly of the suction conduit 51 and beneath the suction fan 48. It will be seen that the baffle 53 extends rearwardly to the casing of the suction fan 48. A discharge spout 54 is disposed in the bottom of the hopper 58 and a pivoted door 56, located in the discharge spout 54 controls the discharge of peanuts from the hopper. The door 56 tends to close due to suction into the casing and a spring 57 connected thereto aids in opening the door when a predetermined weight of material accumulates on the door. The material is discharged onto the

rearward end of the fine screen 37. The suction through the conduit 51 is so regulated that peanuts, together with light trash and sticks are drawn up into the casing of the separating unit 47, allowing the sand and fine rocks to fall onto the screen 37. Within the casing, the material drawn up strikes the baffle 53 which directs the heavier peanuts and sticks downwardly into the settling hopper 58, and the light sticks and trash are discharged outside the casing by means of the fan 48 and conduit 49.

The sand passing through the relatively fine screen 37 falls on the floor 41 of section A and moves rearwardly to a discharge spout 59 where it passes out at the side of the machine. As the section A is reciprocated, the peanuts, together with the remaining sticks and trash move rearwardly over the relatively coarse screen 38. The peanuts pass through the screen 38 onto the floor 41, leaving the larger sticks and trash on the screen which travel rearwardly to a side discharge spout 39 which carries them off to one side of the machine.

Disposed over the rear of section A is a second pneumatic separating unit 62, similar to the separating unit 47 already described and comprising a rectangular casing having a fan, or blower 63 located within its casing which discharges through a conduit 64 outside the casing. At the forward side of the separating unit is a suction conduit 66 which extends downwardly across section A over the rearward end of floor 41 where is located a relatively fine screen 61 through which air is drawn. The suction conduit 66 picks up the peanuts and light trash off the floor 41 carrying them up into the casing. An adjustable gate 67 at the lower end of the conduit 66 controls the size of the opening into the conduit 66 and a damper 65 regulates the strength of the suction through the conduit 66. Small stones, left in the peanuts, pass under the adjustable gate 67 and into a spout 68 where they are discharged from the side of the machine. The separating unit 62 is provided inside the casing with a baffle 69 which directs the heavier particles downwardly away from the blower 63 while rearwardly of the suction conduit 66 is a settling hopper 73 having a discharge spout 71 controlled by a weighted trap door 72 located at the lower end of the hopper. In operation, peanuts, together with the remaining light trash and leaves are picked up by the suction unit 62 and drawn up through the suction conduit 66 into the casing of the unit. The peanuts and heavier particles are thrown downwardly into the hopper 73 by means of the baffle 69, while the lighter particles are discharged by means of the fan, or blower 63. The peanuts are intermittently discharged from the hopper 73 by means of the weighted trap door 72 onto a relatively fine screen 74 at the rearward end of section B.

In the operation of the apparatus as so far described, some of the peanut shells will be broken, releasing the kernels, and the relatively fine screen 74 is intended to screen out these shelled peanuts before they are finally discharged. They fall through the screen 74 onto a floor 76 in the bottom section B, and move forwardly as indicated by the arrows to a spout 77 which discharges them from the apparatus. The unshelled peanuts continue to travel forwardly and pass onto a relatively coarse screen 78. A partition 79 divides the space beneath the screens 74 and 78. The openings in the screen 78 of section B are of a size to screen out the peanuts, leaving any larger

trash on the screen. The peanuts fall onto the floor 76 and are carried forwardly by the reciprocation of the section to be discharged finally from a spout 81 at the forward end thereof. The sticks and other trash are carried on the screen to a discharge spout 82.

From the foregoing description it will be seen that peanuts, as they come from the field, containing sand, rocks, leaves, sticks and other foreign material, are fed by a controlled feed from the feed hopper 42 and feed plate 43, into suction conduit 51 of separating unit 47 where light trash, leaves and sticks are removed leaving the sand and rocks on screen 37 where the sand is screened out. In the separating unit, the material strikes the deflector 53, and the heavier peanuts fall downwardly into the settling hopper 58, while the lighter trash is drawn out and discharged by the blower 48. When sufficient peanuts accumulate over the trap door 56, it opens and the peanuts are discharged from the settling hopper 58, falling onto the fine screen 37, and moving from there onto the coarser screen 38. The sand falls through the screen 37 and is discharged through the discharge spout 59. The peanuts are screened out by the relatively coarse screen 38, and sticks and trash are carried rearwardly and discharged over the screen through the spout 39. The peanuts passing through the screen portion 38 fall on the floor 41 and are carried rearwardly on the floor to the short screen section 61. The peanuts are then picked up by suction off the screen 61 and carried upwardly through the suction conduit 66 into the pneumatic separating unit 62. There, the peanuts strike the baffle 69 and fall downwardly into the settling hopper 73, while the lighter particles are carried by the blower 63. The peanuts are discharged from the hopper 73 intermittently by the trap door 72, and fall onto the fine screen portion 74 of section B of the apparatus. There, the shelled peanuts are screened out to pass away out from the machine through the spout 77. The cleaned unshelled peanuts, pass onto the screen portion 78 of section B and through said screen portion to the floor 76 from which they are discharged through the spout 81. Any sticks or larger trash remaining in the peanuts after passing through the pneumatic separating unit 62 pass over the forward end of the screen portion 78 and are carried away by the spout 82.

From the foregoing it will be apparent that we have devised an improved peanut cleaner by means of which the peanuts are subjected to successive mechanical shaking, screening and pneumatic separating action. It will also be apparent, that by means of our improved apparatus, peanuts are thoroughly cleaned and freed of sand, sticks, rocks, light trash, and other foreign materials, and are finally discharged from the apparatus thoroughly clean and free from all foreign material.

While we have shown our invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications, without departing from the spirit thereof, and we desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What we claim is:

1. In a peanut cleaner, a horizontally disposed shaking screen divided in the direction of movement of material thereover into a relatively fine sand screen portion at the feed end and a coarser screen portion at the discharge end through which peanuts pass, a casing mounted over the sand screen portion, a blower mounted in the casing and discharging outwardly therefrom, a suction conduit connected to the casing and extending downwardly over the feed end of the screen, means to feed peanuts to be cleaned into the side of the suction conduit at a point above the screen, a settling hopper in the casing, said suction conduit being adapted to carry the peanuts and trash up into the casing leaving the sand and rocks behind, and the blower being adapted to separate the trash from the peanuts, the peanuts settling by gravity into the settling hopper, and a trap door in the bottom of the hopper operable responsive to weight of material on it for intermittently discharging the peanuts onto the sand screen portion.

2. In a machine for cleaning peanuts as they come from the field, superposed substantially horizontal shaking screen assemblies, the upper of said screen assemblies being divided in the direction of material flow thereover into a relatively fine sand screen portion and a relatively coarse screen portion through which peanuts are adapted to pass, a floor under said screen portions, a discharge chute for sand and other fine heavy particles connected to the floor near the delivery end of the fine screen portion, a delivery chute for trash remaining on the coarse screen portion, a delivery chute for rocks at the end of the floor, a pneumatic separating apparatus mounted over the feed end of the screen assemblies and adapted to lift peanuts and light material up into the apparatus, leaving sand, rocks and heavy material on the screen and to separate and discharge light material, said separating apparatus comprising a casing, a blower mounted wholly in the casing and discharging out of the casing, a suction conduit connected with the casing and depending downwardly over the screen, means to feed peanuts to be cleaned into one side of the suction conduit at a point above the screen, a settling hopper in the casing extending downwardly over the screen, and means to discharge peanuts from the settling hopper intermittently onto the screen.

3. In a machine for cleaning peanuts as they come from the field, superposed, substantially horizontal shaking screen assemblies, the upper of said screen assemblies being divided in the direction of material flow thereover into a relatively fine sand screen portion adapted to pass sand and the like and a relatively coarse screen portion through which peanuts are adapted to pass, a floor under said screen portions, a discharge chute for sand and other fine heavy particles connected to the floor near the delivery end of the fine screen portion, a sand screen at the delivery end of the floor beyond the coarse screen portion, a delivery chute for trash remaining on the coarse screen portion, a delivery chute for rocks at the end of the floor, a pneumatic separating apparatus mounted over the feed end of the sand screen portion and adapted to pick up peanuts and light trash leaving sand, rocks and heavy material thereon and to separate and discharge light material, said separating apparatus comprising a casing, a blower mounted wholly in the casing and discharging out of the casing, a suction conduit connected with the casing and depending downwardly over the screen, a settling hopper in the casing extending downwardly over the screen, means to feed pea-

nuts mixed with trash, sand and rocks into a side of the suction conduit above the screen, means to discharge peanuts from the settling hopper intermittently back on the screen, and a second pneumatic separating apparatus similar to the first mentioned pneumatic separating apparatus disposed over said sand screen at the delivery end of the upper screen assembly floor and adapted to separate more light trash from the peanuts and deliver them onto the lower screen assembly.

4. In apparatus for cleaning peanuts when first picked and mixed with sand, rocks, sticks and light trash, in combination with a shaking screen adapted to remove the sand, rocks, and sticks therefrom, a pneumatic separating apparatus for removing light trash comprising a casing, a blower mounted wholly within the casing and discharging outside the casing, a suction conduit connected with the casing and extending across the screen, means to feed peanuts to be cleaned into a side of said suction conduit at a point above the screen, a settling hopper in the casing beneath the blower, downwardly opening lateral inlet conduits associated with the blower and positioned over the settling hopper at a point removed from the open upper end of the suction conduit, a discharge spout in the bottom of the settling hopper over the screen, a weighted trap door controlling the discharge spout, and means to adjust the suction through the suction conduit to pick up peanuts and light trash and separate them from the rocks and sand.

5. In apparatus of the character described, a screen divided into a relatively fine section for passing fine heavy particles and a coarse section for passing peanuts, a pneumatic separating unit having an intake duct disposed over the fine section of the screen, means to feed peanuts mixed with loose sand and rocks into one side of said

intake duct at a point above the screen, a blower in the pneumatic cleaning unit for drawing a current of air through said intake duct, said current of air being of sufficient velocity to draw the peanuts into the unit and of insufficient velocity to draw the loose sand and rocks thereinto, a settling chamber in the cleaning unit into which peanuts fall by gravity upon entry into the cleaning unit, a discharge outlet in the bottom of the settling chamber above said fine section of the screen and positioned to deposit peanuts onto the fine section, means to move the peanuts over the surface of said screen from the fine section to coarse section thereof, means beneath the fine section for removing sand passed therethrough, and means beneath the coarse section to receive peanuts passed thereby.

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