Sept. 16, 1958 E. C. MARTIN 2,851,829

APPARATUS FOR CLEANING OBJECTS

Filed Sept. 27, 1956

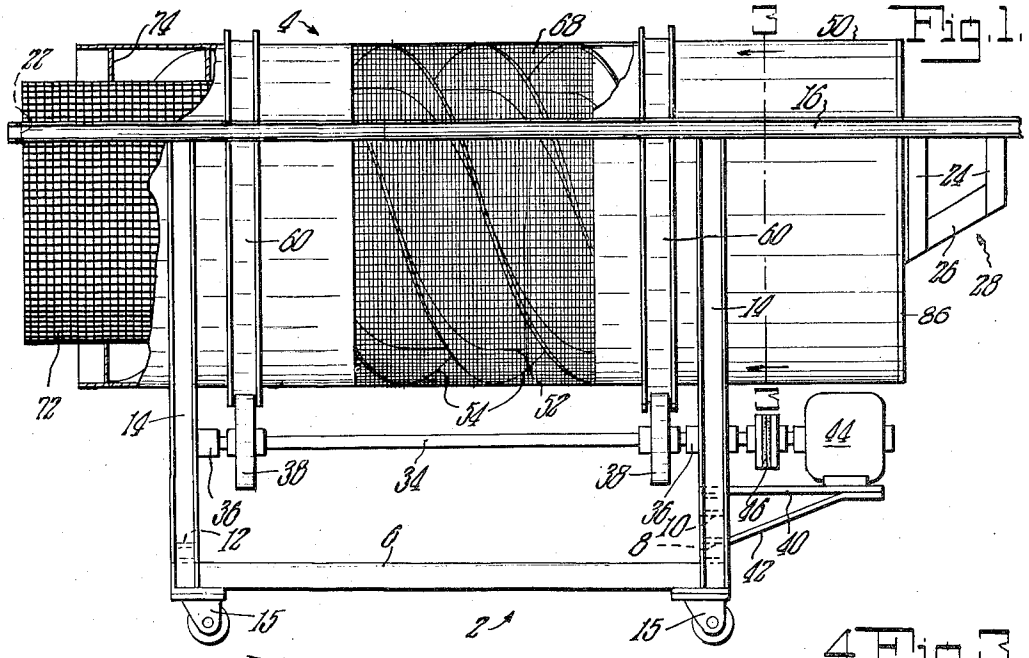


Fig. 1.

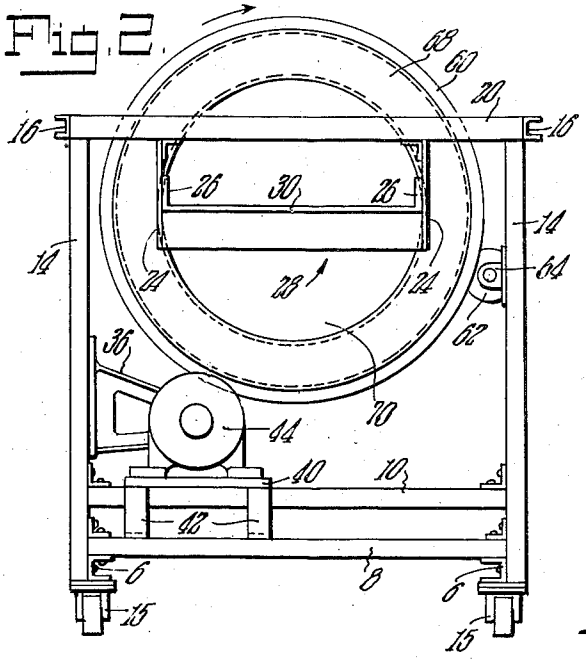


Fig. 2.

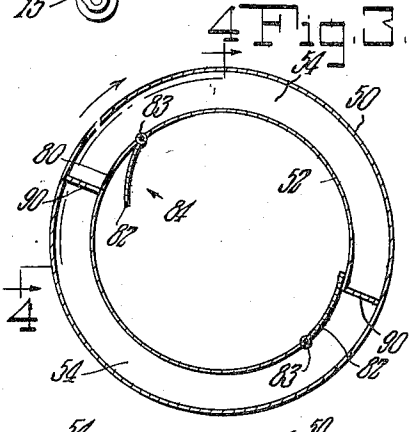


Fig. 3.

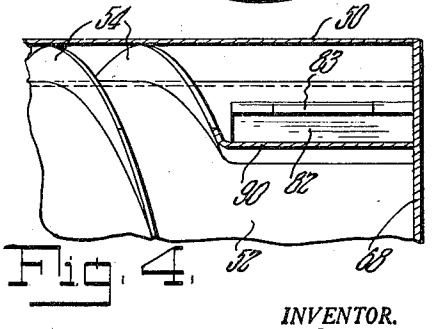


Fig. 4.

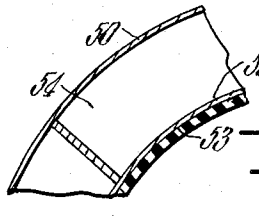


Fig. 5.

INVENTOR.
Edwin C. Martin.
BY
Toss & Ross, Attys.

United States Patent Office 2,851,829 Patented Sept. 16, 1958

2,851,829

APPARATUS FOR CLEANING OBJECTS

Edwin C. Martin, Amherst, Mass.

Application September 27, 1956, Serial No. 612,485

4 Claims. (Cl. 51—164)

My invention relates to new and useful improvements in apparatus for cleaning objects and is directed more particularly to the provision of an apparatus for cleaning produce such as vegetables, fruits and the like and having a means for collecting rocks and the like and for removing dirt and the like as the vegetables or fruits are moved through an agitating and cleaning zone.

It is the principal object of my invention to provide a novel and improved construction of the type in which a compartmentized tank is provided with conveying and agitating means whereby the articles being cleaned are separated from debris such as dirt, dust, sticks, stones and the like which will eliminate the now present objectionable inconveniences and which will operate with a maximum amount of ease and with a minimum degree of effort.

On of the primary purposes of my invention is to provide structural and operational improvements in devices of the class to which reference has been made, which improvements not only simplify the structure as such, but also provide important distinct advantages in strength, durability, efficiency and the like including economy of manufacture, installation and service.

By means hereof, it is now possible to clean a large number of objects per hour and to deal with each object in such a manner as to ensure effective results without damage to the objects themselves, all as is desired.

With the above primary objects in view, it is another object of my invention to provide a construction of the above described character in which the number of operating parts is greatly reduced and which is compact in accordance with the demands and desires of manufacturers and purchasers alike and which is not only distinctive in its appearance and practical in its value but also reliable in its operation and efficient in its use.

It is a still further object to provide a device which is constructed of relatively simple parts which are adapted to be readily assembled and which when once assembled are positively and securely retained in operative relationship and which cannot be readily separated from each other, either accidentally or otherwise.

The common existing practise in the trade is to wash the vegetables or fruits by means of a fluid as same are passed through a tank or the like. Such constructions heretofore known all have certain common and obvious objection that in order to operate them a cleaning fluid must be employed which is liable to do irreparable harm to the articles being cleaned. Accordingly, I have devised a novel means whereby these difficulties and objections are overcome. I accomplish this by the provision of a device which obviates the necessity for employing a fluid in the first instance.

As conducive to a clear understanding of the invention, attention is invited to the other common expedient of cleaning produce in brush machines having a plurality of rotating brushes. Material damage frequently results to the relatively tender articles of produce as a result of this contact with the brushes.

Accordingly, an important object thereof is to provide a produce cleaning machine having novel means for the cleaning of the produce admitted thereunto whereby this objectionable material damage thereof is obviated.

Other prime objects of my invention include, first, the securement of a higher degree of accuracy and greater degree of variety in the manner of work performed therewith than has heretofore been possible with prior devices known in the art; second, the attainment of a higher speed of construction and assembly of the device due to its simplification of design and its unique composition of parts; third, the attainment of a flexibility or a capability of adjustment by which a large variety of work can be produced by means of the same device; fourth, the achievement of a greater ease in adjustment and repairs; fifth, the provision of an improved apparatus for cleaning objects which may be made more economically and with fewer operations in the manufacture of its parts, as well as in the assembly of the same, than prior devices known in the art; sixth, the provision of a construction which may be readily installed with respect to the various purposes for which it is intended, and seventh the provision of such other improvements in and relating to apparatus for cleaning objects of the type above referred to as are hereinafter described and claimed.

Although my invention will be described herein with particular reference to a vegetable or fruit cleaner such as a potato cleaner, it should be appreciated that its utility and application extend beyond the particular type of cleaner herein specified and comprehend the useful and novel features set forth when applied to any articles which are susceptible to a cleaning operation where dirt or the like is desired to be removed therefrom as the articles are conveyed through agitating and cleaning zones of a cleaning construction.

That is, while the terms vegetables or fruits are used in this specification, it will be understood that the invention is conceived as applicable for use with a myriad number of articles from which it is desired to remove dirt and the like all without material alteration to the structural features of the invention.

Accordingly, limitation of this invention should be made only as determined by a proper interpretation of the terms used in the subjoined claims.

Further objects and advantages of my invention will become apparent as the following description proceeds, and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this invention.

In the accompanying drawing, I have illustrated a complete example of a physical embodiment of the invention in which the parts are combined and arranged in accordance with one mode of the principles of the invention. It will be understood however that changes and alterations are contemplated and may be made in these exemplifying drawings and mechanical structures, within the scope of the claims, without departing from the principles of the invention.

In the drawings:

Fig. 1 is an elevational view of the front side of the apparatus for cleaning objects embodying the novel features of the invention;

Fig. 2 is an elevational view of the forward or front end of the apparatus shown in Fig. 1;

Fig. 3 is a sectional elevational view on the line 3—3 of Fig. 1;

Fig. 4 is a longitudinal sectional view on the line 4—4 of Fig. 3; and

Fig. 5 is a transverse sectional view through a portion of the periphery of the cylindrical structure of the invention.

In the following description and claims, various details will be identified by specific names for convenience. These names however are intended to be as generic in their application as the art will permit.

Referring now to the drawing more in detail, in which similar characters of reference indicate corresponding parts in the several figures and referring more particularly to the preferred form of my invention selected for illustrative purposes, I have shown an apparatus which in a general way includes a supporting structure **2** and an elongated cylindrical structure rotatable relative thereto on a generally horizontal axis.

Objects to be cleaned are introduced at the forward inlet or entrance end of the cylindrical structure and are discharged at the rear end thereof in a cleaned condition. While the apparatus is adapted for many and various uses reference will be made to the use thereof for cleaning sand, earth and the like from potatoes which adheres thereto after they have been dug from the ground. Cleaning material of various kinds may be used but small chunks of rubber have been found to be desirable for cleaning potatoes as they are not injured by rubber chunks, or the like.

The supporting structure **2** will first be described in the form at present preferred. Various other forms may be as well adapted for the practice of the invention.

Lower longitudinal stringers **6** are connected in transversely spaced relation at their forward ends to opposite ends of transverse struts **8** and **10**. Rear ends of the stringers **6** are similarly connected by one or more transverse members indicated by **12**.

Columns **14** have their lower ends connected to opposite ends of the stringers **6** and extend vertically upwardly therefrom. Upper ends of said columns **14** are secured to upper elongated stringers **16**, as in Fig. 1.

The ends of the stringers **16** at their forward ends are connected to opposite ends of an upper transverse strut **20**, see Fig. 2. Rear ends of the stringers are connected to opposite ends of a transverse strut **22**, see Fig. 1.

Hangers **24** depend from the strut **20** and are secured to the side walls **26** of a U-shaped trough or hopper **28**, having a bottom wall **30**. The said wall **30** declines and objects to be cleaned are placed in the hopper for movement into the cleaning apparatus.

The components of the support will be of metal shapes of well known form, and will be secured together by riveting, bolting, welding and other well known ways to provide a strong, and a rigid unitary structure.

A drive shaft **34** is rotatable in bearings **36** which are secured to the columns **14** at the forward side of the supporting structure. Wheels **38** are fixed to said shaft. A platform **40** is secured to the strut **10** and braces **42** have opposite ends secured to the platform **40** and strut **8**.

An electric motor **44** secured to the platform **40** is connected to the drive shaft **34** through a flexible coupling **46**. As the motor is energized the drive shaft and wheels **38** are rotated, to rotate the cylindrical structure.

The cylindrical structure includes an elongated tubular outer shell **50** and an inner hollow barrel **52** spaced apart in concentric relation by transporting means which may consist of two helical members **54**. The said transporting means extends substantially throughout the length of the shell **50**.

The shell **50** is provided with circumferential tracks **60** which are preferably channel shape in cross section. Said tracks roll on the wheels **34**. Other wheels **62** rotatable in brackets **64** fixed to the rear columns are also received in the tracks **60**, see Fig. 2.

Thus the cylinder structure is supported and guided for rotation by operation of the motor **44**. For purpose of disclosure the shell **50** is rotated in a clockwise direction, with reference to Figs. 2 and 3.

The shell **50** intermediate its ends is provided with a section **68** of foraminous screen. A forward ring-like

end plate **86** is secured to the ends of the shell **50** and barrel **52**, providing an entrance **70** to the forward end of said barrel.

The rear or discharge end portion of the barrel **52** is provided with a section **72** of foraminous screen, see Fig. 1. An annular ring-like rear end wall **74** connects the end of shell **50** and the rear end section **72** of the barrel **52**.

Each transporter **54** is in the form of a helix and extends along and between the shell **50** and barrel **52**.

The components constituting the cylindrical structure will be formed from suitable metal, and will be secured together in any well known manner as by welding, brazing or the like, in such a way as to be self supporting and provide a strong and rigid integral structure.

The barrel **52** at its forward end is provided with an opening **80** thereinto for each helical transporter. A closure **82** for each said opening is hinged at **83** for swinging between the open position, indicated by **84**, and a closed position, indicated by **86**, in Fig. 3. Means may be provided to limit the open position **84** of the closures.

Forward end portions of the helical transporters **54** at the forward ends of the barrel and shell are disposed parallel to the axis of rotation thereof, as indicated by **90**, in Fig. 4. Said portions **90** in cooperation with the adjacent parts provide pockets for cleaning material transported thereto by the transporters.

The inner side of the barrel wall is provided with a resilient lining secured thereto to obviate bruising objects as they are being cleaned. Such lining indicated by **53** in Fig. 5 may consist of any material that is resilient or yieldable such as rubber, leather, fabric, or various plastics or the like.

Objects to be cleaned and cleaning material are fed by means of the hopper **28** into the entrance **70** at the forward end of the barrel **52**. For example the objects may be potatoes and the cleaning material may be pieces or chunks of rubber which are relatively soft and yieldable.

The cylindrical structure declines slightly from the horizontal from the forward entrance end to the rear discharge end of the structure. As the structure is rotated clockwise by operation of the motor the objects and cleaning material are tumbled in the barrel and advance therealong during rotation to the discharge end of the barrel.

The tumbling action causes the cleaning material to loosen and separate from the potatoes, such sand, dirt and foreign substances, as adheres to the potatoes.

The cleaning material and foreign substances approaching the discharge end of the barrel **52** pass through the end section **72** thereof into the space between the shell **50** and barrel **52**.

The helical transporters **54** are of such relation to the direction of rotation of the cylindrical structure that the cleaning material, and foreign substances intermingled therewith and in the space between the shell and barrel are transported to the forward end of the structure, by the transporters.

The mesh of the screen section **68** is such that foreign substances pass outwardly therethrough. The cleaning material is retained in the space or passageway between the shell and barrel. The mesh of the section **72** is sufficient for the passage therethrough of the cleaning material but not sufficient for the passage of the objects being cleaned.

The cleaning material at the forward end of the structure in the end pockets is elevated by the transporter portions **90** in ascending direction of the structure. In a position of the structure where the closures swing to open positions, indicated by **84**, the cleaning material passes through the openings **80** into the entrance end of the barrel. In descending direction of the structure the closures swing to closed position.

Thus objects to be cleaned and cleaning material, as

the structure is rotated, are tumbled and moved from the entrance to the discharge end of the barrel. The cleaning material and foreign substances pass through screen section 72 to the space between the shell and barrel. The cleaned objects are discharged from the end of the screen section. The cleaning material and foreign substances are transported by the transporters to the entrance end of the apparatus during which the foreign substances are eliminated through the screen section 68. Finally the cleaning material is returned to the barrel through the openings 80 to be intermingled and tumbled with objects to be cleaned.

Although particular embodiments of my invention have been described, it will be understood by those skilled in the art that the objects of the invention may be attained by use of constructions different in certain respects from those disclosed without departing from the underlying principles of the invention.

I therefore desire by the following claims to include within the scope of my invention all such variations and modifications by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

Having thus described my invention, what I claim as new is:

1. Apparatus for cleaning objects such as potatoes and the like of foreign substances comprising in combination, a supporting structure, an elongated cylindrical tubular structure having forward entrance and rear discharge ends, cooperating means on said supporting structure and tubular structure for rotatably supporting the outer side of said tubular structure at longitudinally spaced points disposed inwardly of forward and rear ends thereof for rotation of said tubular structure on an axis declining slightly from the horizontal from forward to rear ends thereof, said tubular structure including an elongated hollow outer shell and an elongated hollow inner barrel, forward and rear end rings secured to forward and rear end portions of said outer shell and inner barrel spacing said shell radially from said barrel and closing the ends of the space therebetween and providing an unobstructed entrance for objects to be cleaned into the forward end of the barrel and an unobstructed discharge at the rear end thereof, transporting means in the space between said shell and barrel including a plurality of longitudinally extending circumferentially spaced spirally arranged members adapted to transport cleaning material from the rear to the forward end of the tubular structure in rotation thereof, a portion of said outer shell between said longitudinally spaced points being in the form of a screen adapted for the passage of foreign substances therethrough from the space between the outer shell and barrel, a portion of the inner shell at the rear end thereof being in the form of a screen for the passage of cleaning material and foreign substances therethrough into the space between said outer shell and inner barrel, discharge means at the forward end of the inner barrel for discharging cleaning material from the forward portion of the space between the outer shell and inner barrel into the forward end of said barrel, and means for delivering objects to be cleaned into the forward end of the inner barrel.

2. Apparatus set forth in claim 1 wherein said discharge means includes circumferentially arranged openings provided through end portions of the inner barrel into the interior thereof disposed circumferentially between the ends of the transporting members and closures for said openings hingedly mounted on the inner barrel arranged to open as the said openings are at the upper quadrant of the rotation of the tubular structure.

3. Apparatus for cleaning objects of foreign substances comprising, a supporting structure, an elongated cylindrical tubular structure having forward entrance and rear discharge ends, cooperating means on said supporting and tubular structures for rotatably supporting said tubular structure at longitudinally spaced points disposed inwardly of forward and rear ends thereof for the rotation of said tubular structure on an axis declining slightly from the horizontal from forward to rear ends thereof, said tubular structure including an elongated hollow outer shell and an elongated hollow inner barrel spaced inwardly thereof, transporting means in the space between said outer shell and inner barrel including a plurality of longitudinally extending circumferentially spaced spirally arranged members adapted to transport cleaning material from the rear to the forward end of said tubular structure on rotation thereof, a portion of said outer shell between the longitudinally spaced points being in the form of a screen adapted for the passage of foreign substances therethrough from the space between said outer shell and inner barrel, a portion of said inner shell at the rear end thereof being in the form of a screen for the passage of cleaning material and foreign substances therethrough into the space between said outer shell and inner barrel, discharge means at the forward end of said inner barrel for discharging cleaning material from the forward portion of the space between said outer shell and inner barrel into the forward end of said barrel, and means for delivering objects to be cleaned into the forward end of said inner barrel.

4. Apparatus set forth in claim 3 wherein said discharge means includes circumferentially arranged openings provided through end portions of said inner barrel into the interior thereof disposed circumferentially between the ends of the transporting members and closures for the openings hingedly mounted on said inner barrel arranged to open as the openings are at the upper quadrant of the rotation of the tubular structure.

References Cited in the file of this patent

UNITED STATES PATENTS

1,322,567	Hiller	Nov. 25, 1919
1,525,789	Bartley	Feb. 10, 1925