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Nickels

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(54) **PROCESS FOR ERADICATING INSECTS, SEMI STERILIZING, AND REDUCING AFLATOXIN AND FUMONISIN IN DRY COMMODITIES, AND METHOD OF USE**

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Related U.S. Application Data

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A23B 9/02 (2006.01)
A23B 2/46 (2025.01)
A23B 7/005 (2006.01)

(52) **U.S. Cl.**
CPC ***A23B 7/005*** (2013.01); ***A23B 2/46*** (2025.01); ***A23B 9/02*** (2013.01); *F23D 2205/00* (2013.01)

(58) **Field of Classification Search**
CPC . A23L 3/001; A23L 3/225; A23L 3/22; A23B 7/005; A23B 9/02; B65G 11/206; B65G 47/19; F23D 14/84; F23D 2205/00; F23D 14/20; F23D 14/56; A23V 2002/00
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,515,725 A * 7/1950 McLemore A01C 1/08 47/5
2,523,635 A * 9/1950 Ramstad B02B 3/00 426/456
2,767,076 A * 10/1956 Taylor C21B 13/0073 75/495
3,202,405 A * 8/1965 Stanley F27B 1/005 432/100

FOREIGN PATENT DOCUMENTS

CN 209410820 U * 9/2019
GB 2402865 A * 12/2004 ..... A23B 7/0053
JP 2010233451 A * 10/2010

OTHER PUBLICATIONS

JP-2010233451-A English translation (Year: 2010).*
CN-209410820-U English translation (Year: 2019).*

* cited by examiner

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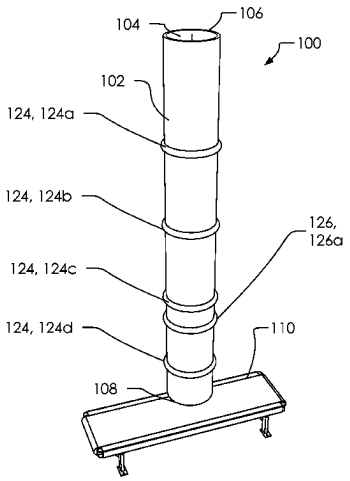
(57) **ABSTRACT**

A pulse cleaning system for disinfecting untreated grains and pulses. The pulse cleaning system comprises an outer body, a top end, a top outer edge, a bottom end, and a conveyor. The pulse cleaning system is useful in cleaning a dry commodity by inserting the dry commodity into the top end, cleaning the dry commodity within the outer body, releasing the dry commodity at the bottom end, and collecting the dry commodity on the conveyor. The outer body comprises a top opening at the top end, and a bottom opening at the bottom end. each among one or more exterior burner assemblies and an interior chamber strip burner is configured to create variable flame according to an end user's preference, or according to amounts of a fuel provided. after treatment by the pulse cleaning system, the dry commodity is referred to as a treated grains and pulses.

15 Claims, 10 Drawing Sheets



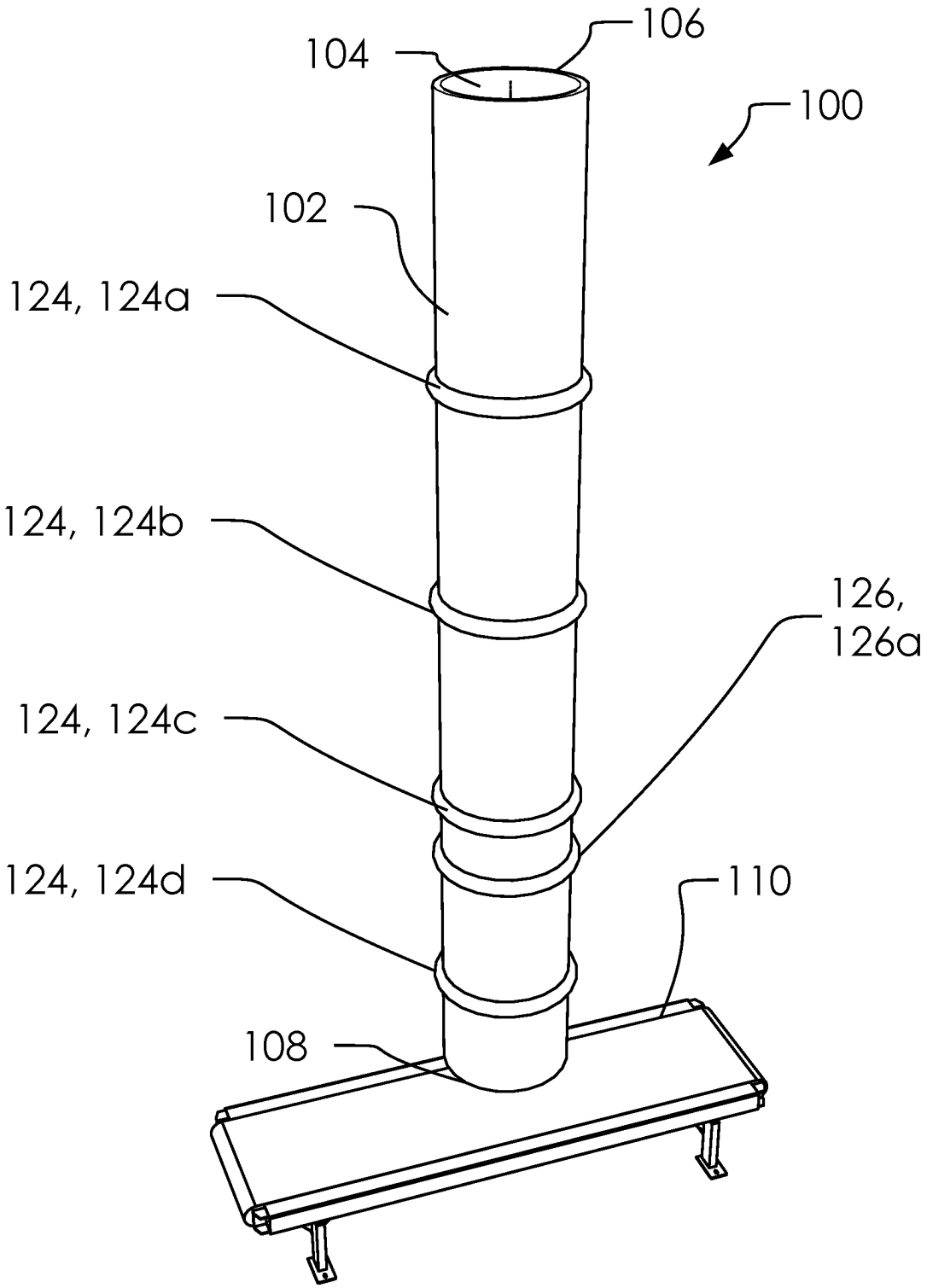

106
104
100
102
124, 124a
124, 124b
126,
126a
124, 124c
124, 124d
110
108

FIG. 1

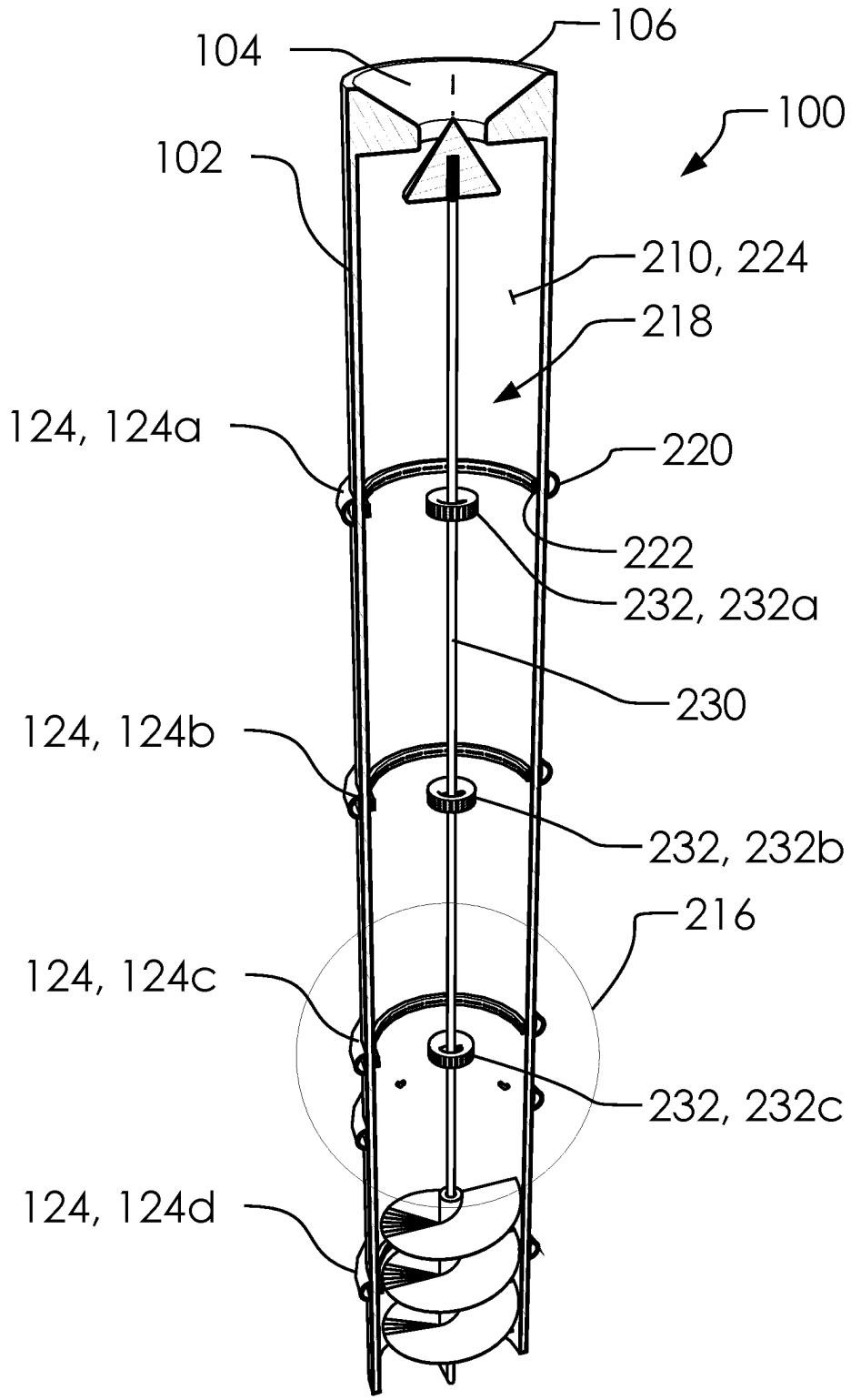

104
106
100
102
210, 224
218
124, 124a
220
222
232, 232a
230
124, 124b
232, 232b
216
124, 124c
232, 232c
124, 124d

FIG. 2

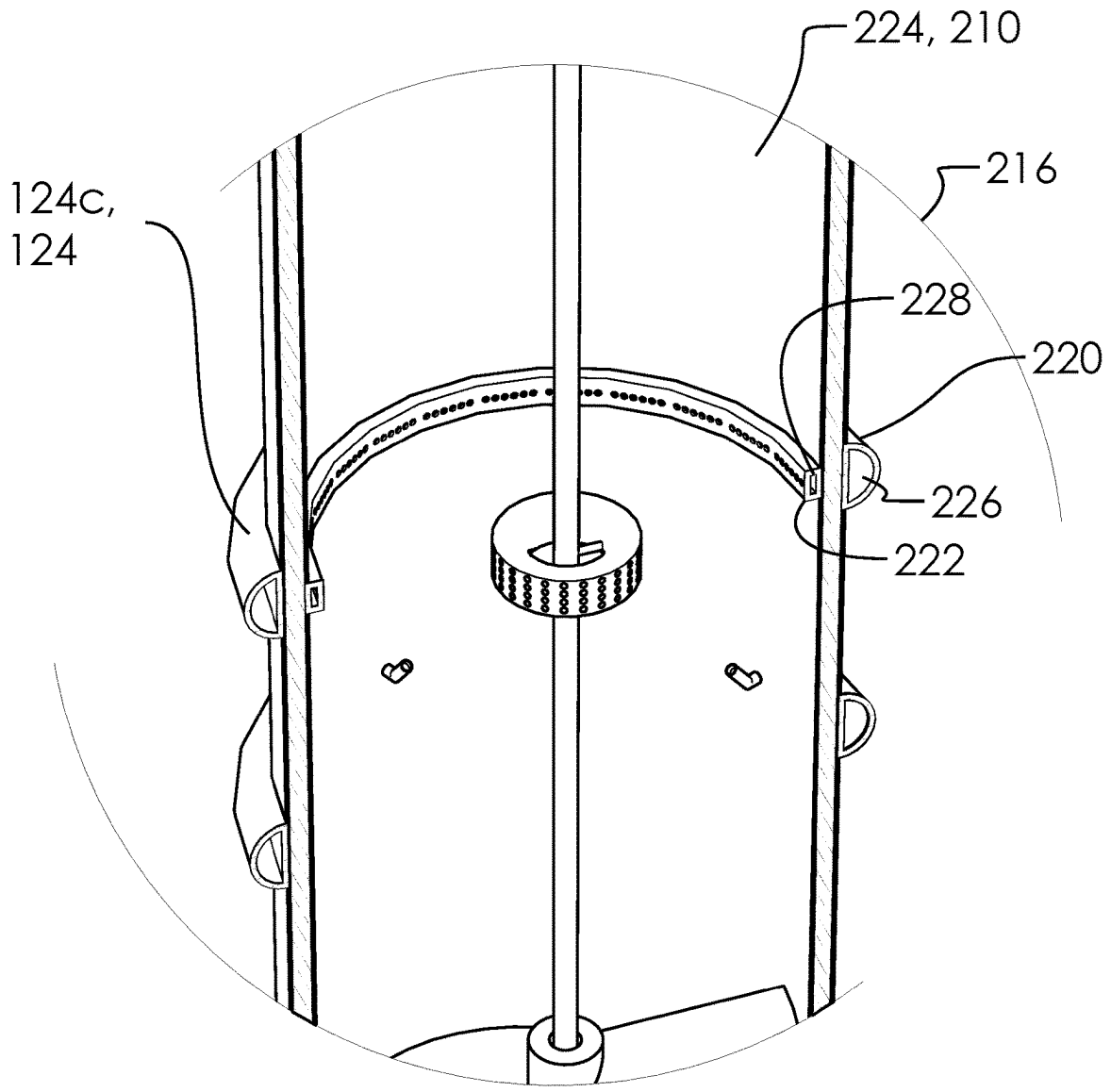


FIG. 3

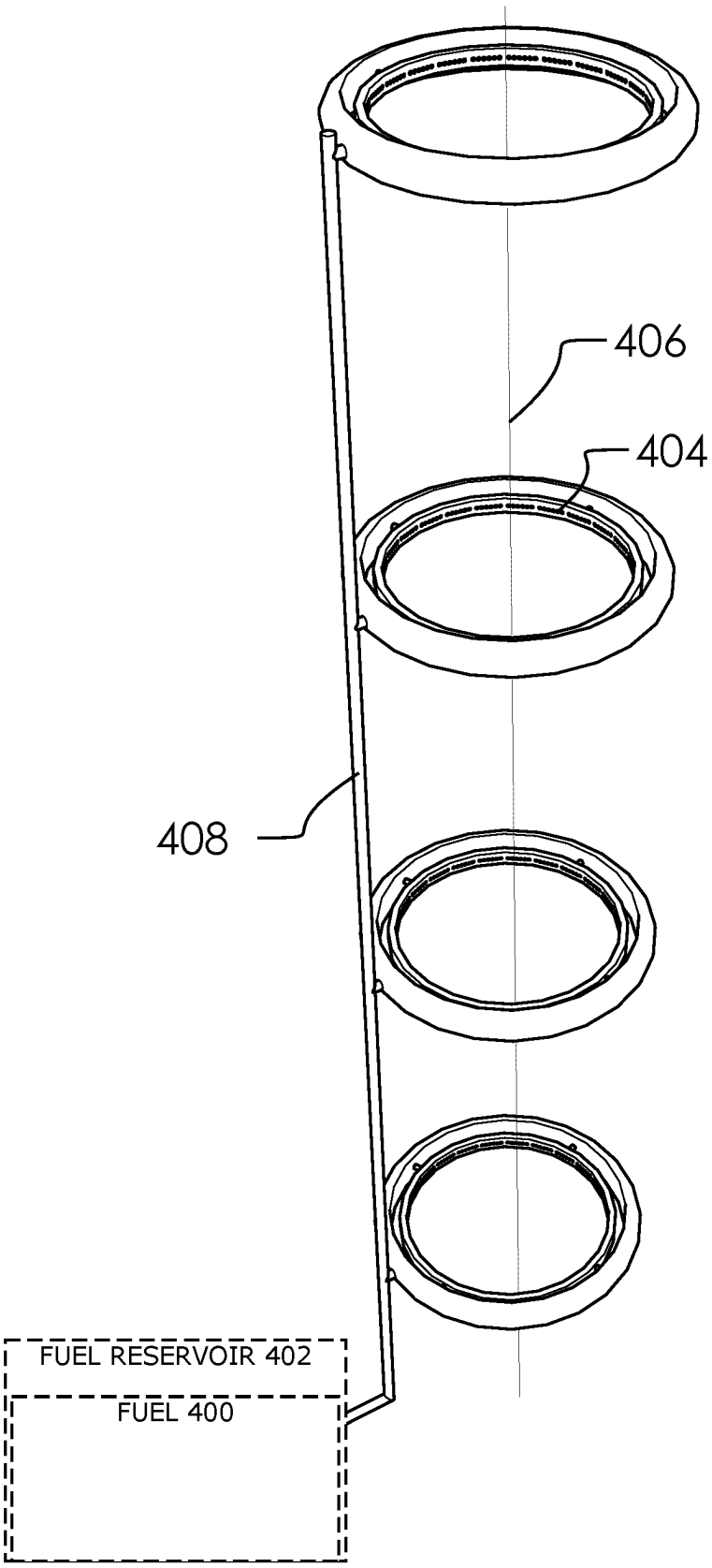


FIG. 4

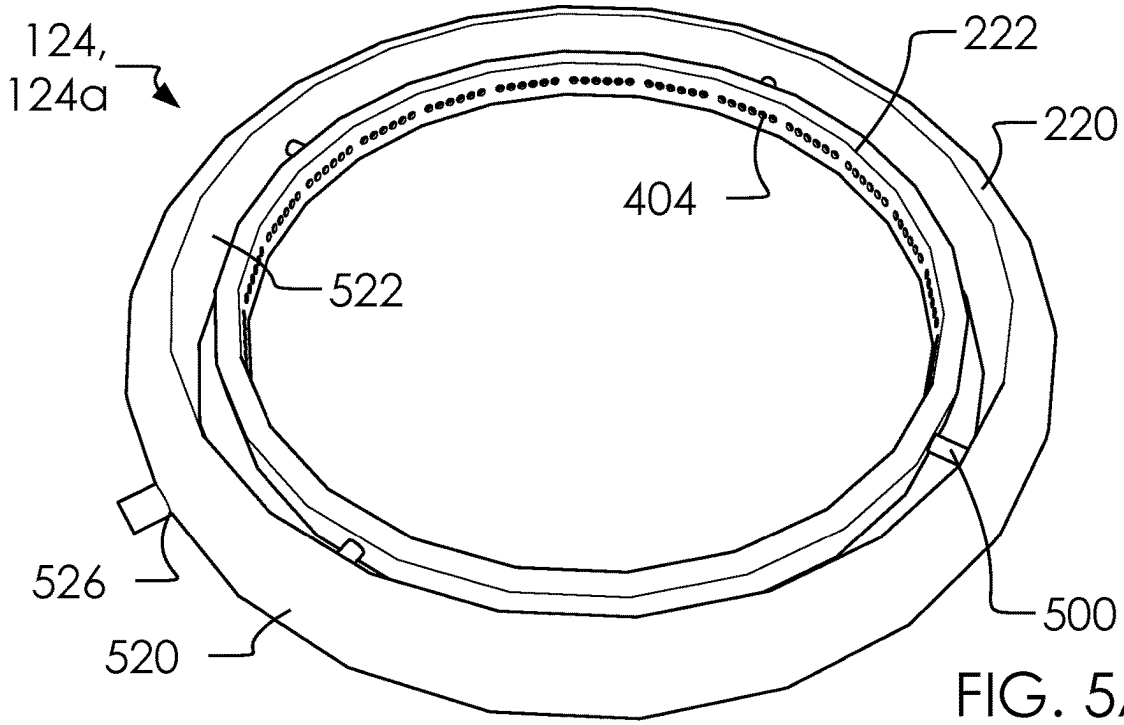


FIG. 5A

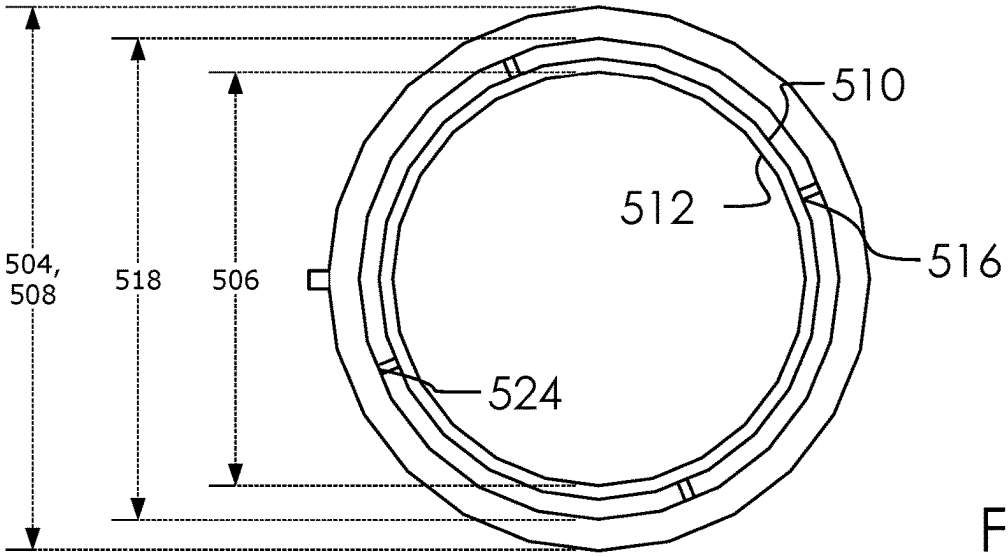


FIG. 5B

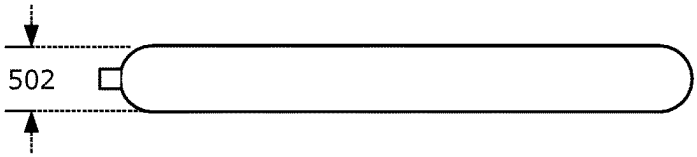


FIG. 5C

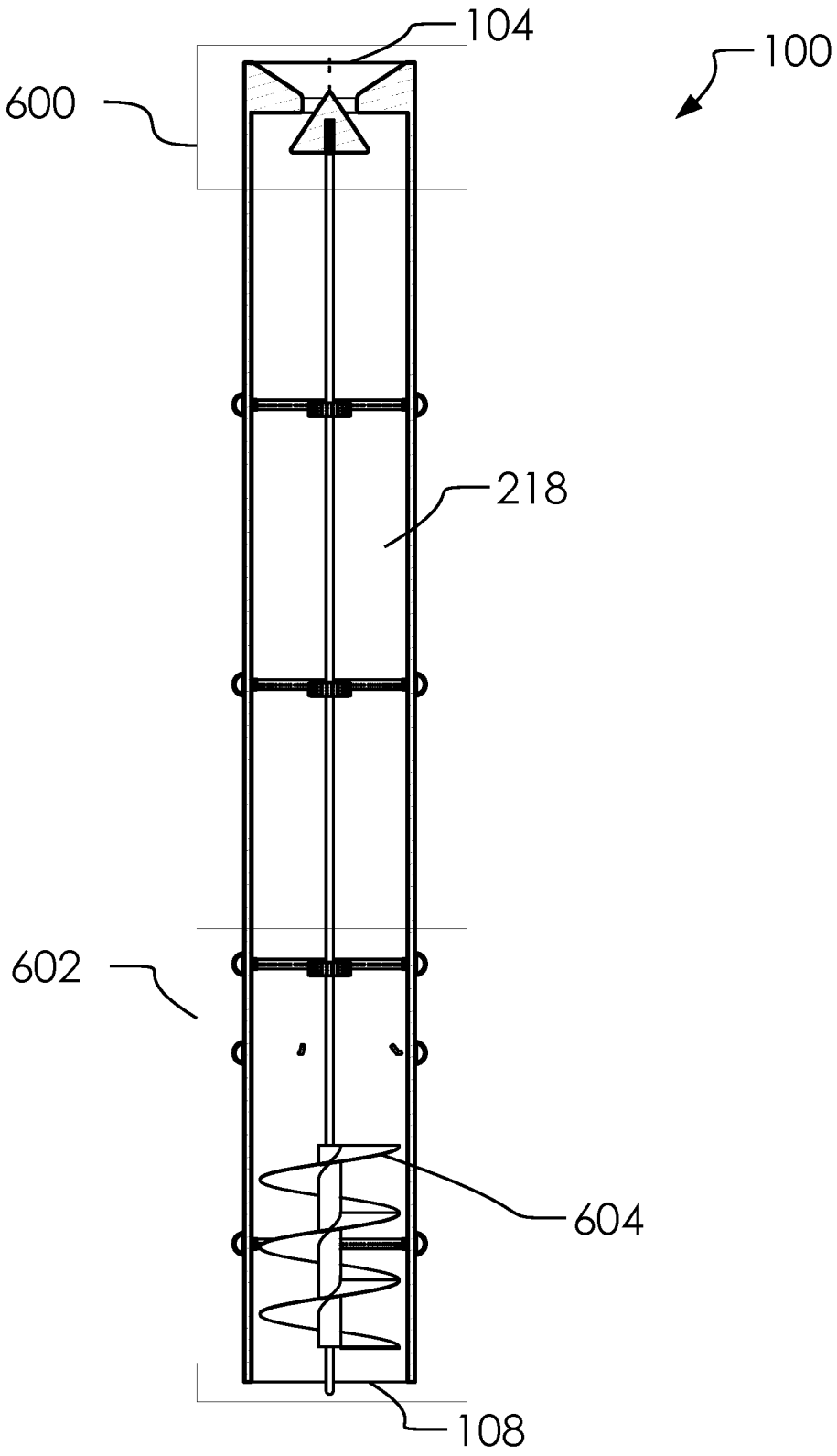


FIG. 6

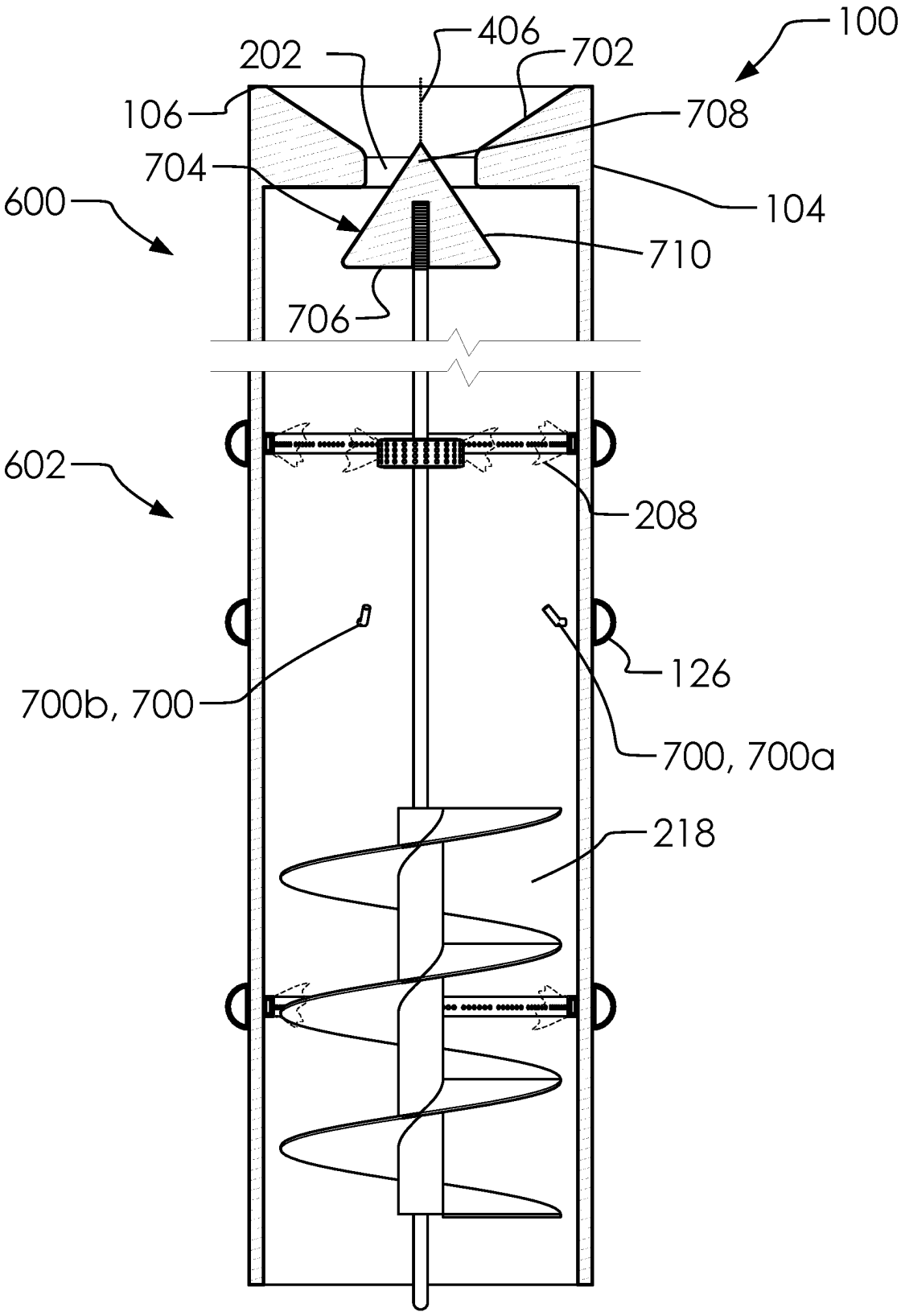

100
406
202
702
106
708
704
104
600
710
706
602
208
126
700b, 700
700, 700a
218

FIG. 7

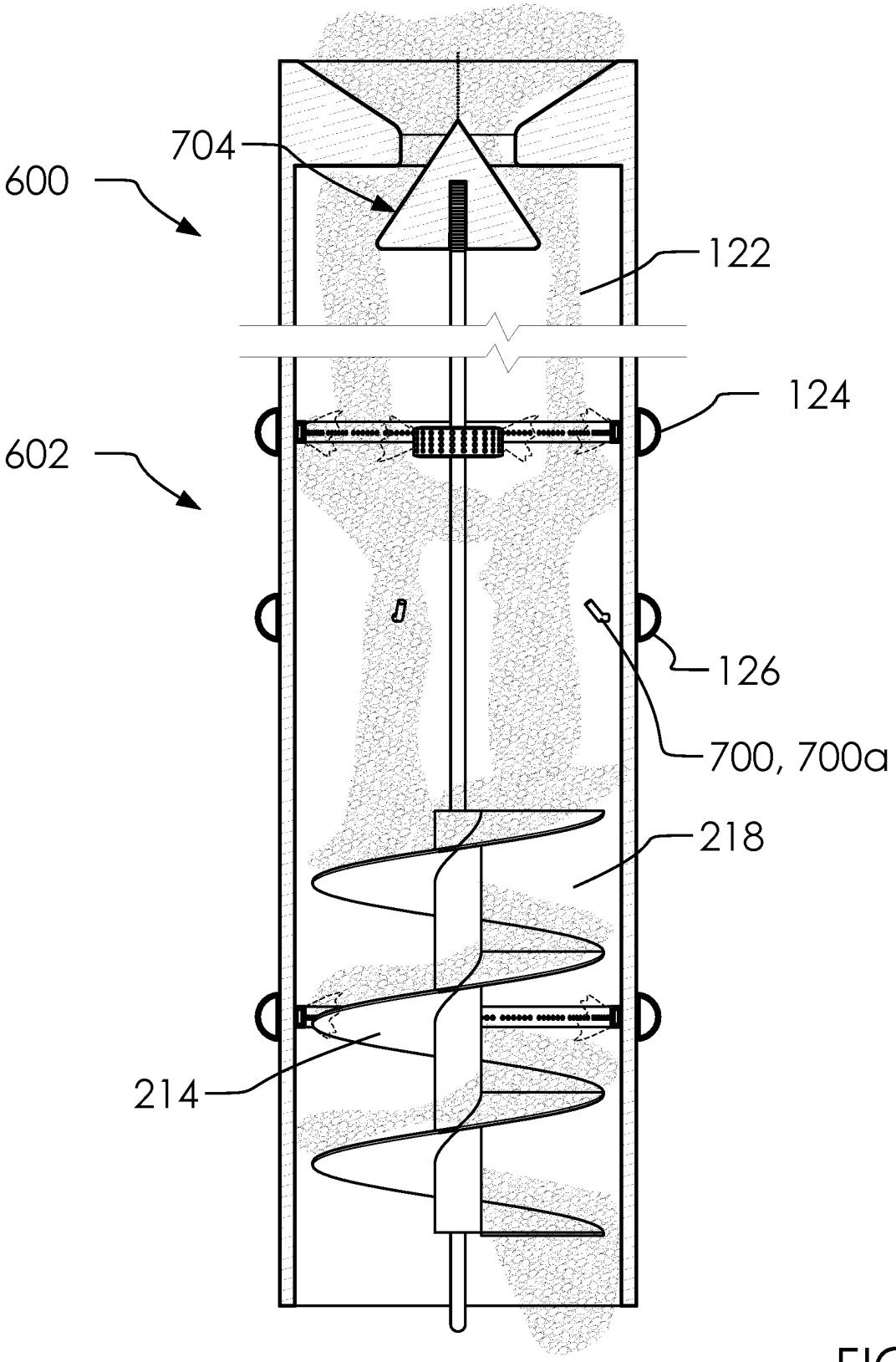


FIG. 8

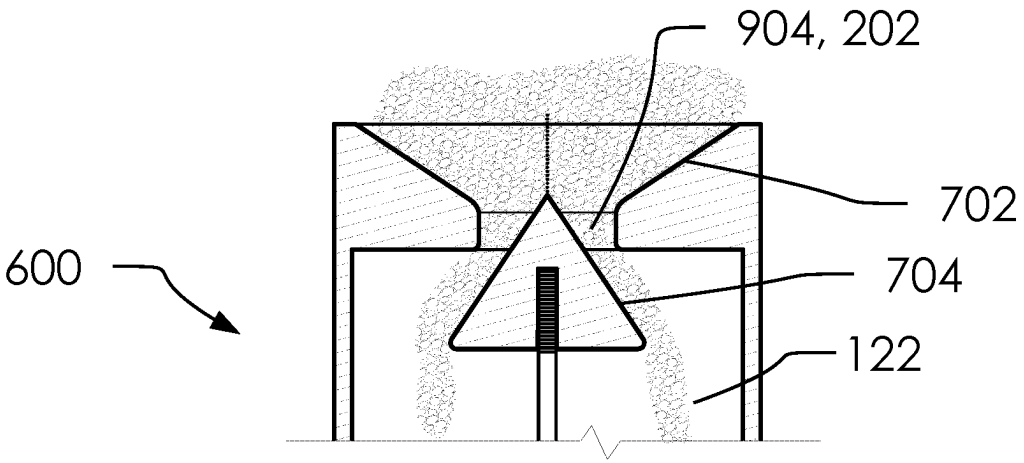


FIG. 9A

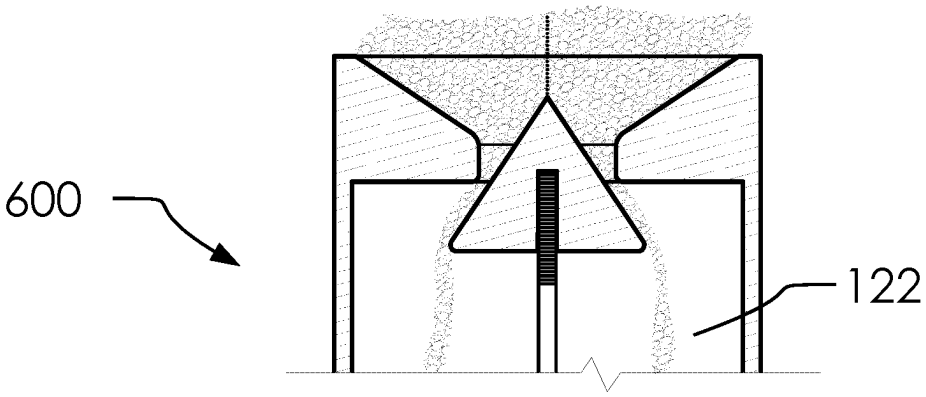


FIG. 9B

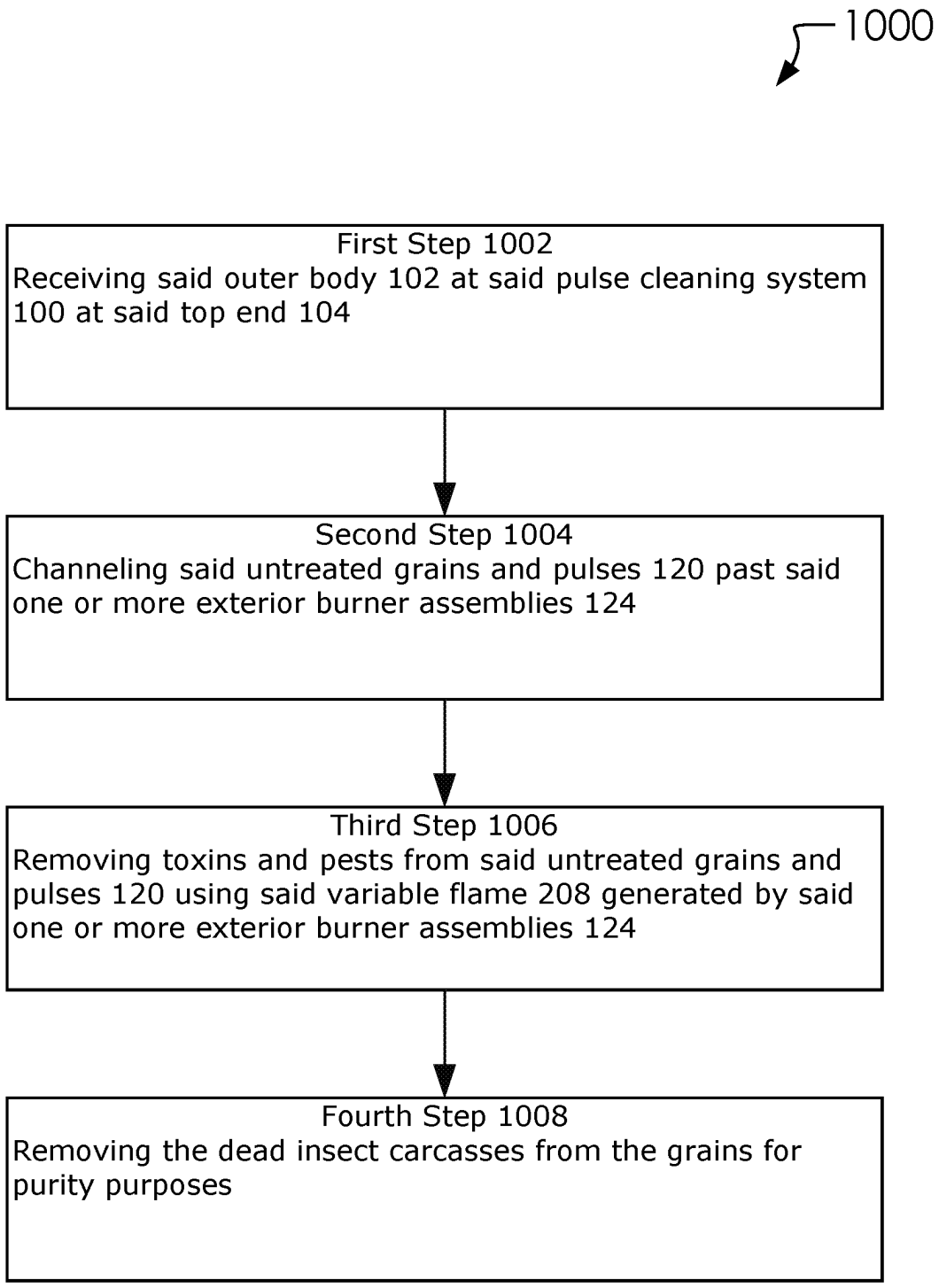

1000
First Step 1002
Receiving said outer body 102 at said pulse cleaning system 100 at said top end 104
Second Step 1004
Channeling said untreated grains and pulses 120 past said one or more exterior burner assemblies 124
Third Step 1006
Removing toxins and pests from said untreated grains and pulses 120 using said variable flame 208 generated by said one or more exterior burner assemblies 124
Fourth Step 1008
Removing the dead insect carcasses from the grains for purity purposes

FIG. 10

PROCESS FOR ERADICATING INSECTS, SEMI STERILIZING, AND REDUCING AFLATOXIN AND FUMONISIN IN DRY COMMODITIES, AND METHOD OF USE

CROSS-REFERENCE TO RELATED APPLICATIONS

Not applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT (IF APPLICABLE)

Not applicable.

REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT DISC APPENDIX (IF APPLICABLE)

Not applicable.

BACKGROUND OF THE INVENTION

The prior art presents the "Snopes grain roaster" which, as far as the Applicant is aware was first used in 2008 to roast grains and pulses. It was configured to feed grains into a vessel using an auger, the grains were then exposed to a flame in the center of the vessel/drum; the vessel was tilted at an angle so as to keep the grains out of the flame.

No prior art is known to the Applicant.

BRIEF SUMMARY OF THE INVENTION

A pulse cleaning system for disinfecting untreated grains and pulses. Said pulse cleaning system comprises an outer body, a top end, a top outer edge, a bottom end, and a conveyor. Said pulse cleaning system is useful in cleaning a dry commodity by inserting said dry commodity into said top end, cleaning said dry commodity within said outer body, releasing said dry commodity at said bottom end, and collecting said dry commodity on said conveyor. Said outer body comprises a top opening at said top end, and a bottom opening at said bottom end. each among one or more exterior burner assemblies and an interior chamber strip burner is configured to create variable flame according to an end user's preference, or according to amounts of a fuel provided. after treatment by said pulse cleaning system, said dry commodity is referred to as a treated grains and pulses.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

FIG. **1** illustrates a perspective overview of a pulse cleaning system **100**.

FIG. **2** illustrates a perspective overview of said pulse cleaning system **100** in cross-section.

FIG. **3** illustrates a detailed perspective view of said pulse cleaning system **100** in cross-section at a call-out **216**.

FIG. **4** illustrates a perspective overview of one or more exterior burner assemblies **124**.

FIGS. **5**A, **5**B, and **5**C illustrate a perspective overview and elevated top view of a first exterior burner assembly **124***a*.

FIG. **6** illustrates an elevated front side view of said pulse cleaning system **100** in cross-section with an upper call-out **600** and a lower call-out **602**.

FIG. **7** illustrates a detailed elevated front side view of said pulse cleaning system **100** in cross-section with said upper call-out **600** and said lower call-out **602** aligned for illustrative purposes.

FIG. **8** illustrates a detailed cross-section elevated front side view of said pulse cleaning system **100** at said upper call-out **600** and said lower call-out **602**, with a dry commodity **122** flowing through an inner chamber **218**.

FIGS. **9**A, and **9**B illustrate an elevated cross-section side view of said upper call-out **600** with a variable plugging assembly **704** in a first configuration **900** and a second configuration **902**.

FIG. **10** illustrates a flow chart of a method of using a pulse cleaning system **1000**.

DETAILED DESCRIPTION OF THE INVENTION

The following description is presented to enable any person skilled in the art to make and use the invention as claimed and is provided in the context of the particular examples discussed below, variations of which will be readily apparent to those skilled in the art. In the interest of clarity, not all features of an actual implementation are described in this specification. It will be appreciated that in the development of any such actual implementation (as in any development project), design decisions must be made to achieve the designers' specific goals (e.g., compliance with system- and business-related constraints), and that these goals will vary from one implementation to another. It will also be appreciated that such development effort might be complex and time-consuming, but would nevertheless be a routine undertaking for those of ordinary skill in the field of the appropriate art having the benefit of this disclosure. Accordingly, the claims appended hereto are not intended to be limited by the disclosed embodiments, but are to be accorded their widest scope consistent with the principles and features disclosed herein.

The following description is presented to enable any person skilled in the art to make and use the invention as claimed and is provided in the context of the particular examples discussed below, variations of which will be readily apparent to those skilled in the art. In the interest of clarity, not all features of an actual implementation are described in this specification. It will be appreciated that in the development of any such actual implementation (as in any development project), design decisions must be made to achieve the designers' specific goals (e.g., compliance with system- and business-related constraints), and that these goals will vary from one implementation to another. It will also be appreciated that such development effort might be complex and time-consuming, but would nevertheless be a routine undertaking for those of ordinary skill in the field of the appropriate art having the benefit of this disclosure. Accordingly, the claims appended hereto are not intended to be limited by the disclosed embodiments, but are to be accorded their widest scope consistent with the principles and features disclosed herein.

FIG. **1** illustrates a perspective overview of a pulse cleaning system **100**.

In one embodiment, said pulse cleaning system **100** can comprise an outer body **102**, a top end **104**, a top outer edge **106**, a bottom end **108**, and a conveyor **110**.

In one embodiment, said pulse cleaning system **100** can be useful in cleaning a dry commodity **122** (illustrated below) by inserting said dry commodity **122** into said top end **104**, cleaning said dry commodity **122** within said outer

body **102**, releasing said dry commodity **122** at said bottom end **108**, and collecting said dry commodity **122** on said conveyor **110**.

Said pulse cleaning system **100** can further comprise one or more exterior burner assemblies **124** (which can comprise a first exterior burner assembly **124***a*, a second exterior burner assembly **124***b*, a third exterior burner assembly **124***c*, and a fourth exterior burner assembly **124***d*), and one or more air blower assemblies **126** comprising at least a first air blower assembly **126***a*.

In one embodiment, said outer body **102** can be cylindrical, as illustrated, or rectangular. In one embodiment, said conveyor **110** can carry said dry commodity **122**, such as grains and pulses, to a tote for shipping.

In one embodiment, pulses and grains can be cleaned and filtered using said pulse cleaning system **100** in a manner superior to the prior art. For example, for organic foods, pesticides are limited or outright disallowed in food production. Accordingly, the current system can be used to control pests without chemical additives.

FIG. **2** illustrates a perspective overview of said pulse cleaning system **100** in cross-section.

As illustrated, said top outer edge **106** can comprise a raised edge around a perimeter of said top end **104**. Wherein, said pulse cleaning system **100** can comprise an inner chamber **218** within said outer body **102**

In one embodiment, said one or more air blower assemblies **126** can receive a pressurized air.

In one embodiment, after untreated grains and pulses **120** are cleaned using said pulse cleaning system **100**, a treated portion can be carried away by said conveyor **110**.

Shown in dashed line is a call-out **216**, to be illustrated in detail in FIG. **3** and discussed below.

Said pulse cleaning system **100** can further comprise a center support cylinder **230** and one or more center strip burners **232** (which can comprise a first center strip burner **232***a*, a second center strip burner **232***b*, and a third center strip burner **232***c*). In one embodiment, said one or more center strip burners **232** can attach to portions of said center support cylinder **230**. In one embodiment, said one or more center strip burners **232** can be roughly aligned with said one or more exterior burner assemblies **124** to ensure said untreated grains and pulses **120** pass between said one or more exterior burner assemblies **124** and said one or more center strip burners **232**.

In one embodiment, said outer body **102** can comprise a top opening **202** at said top end **104**, and a bottom opening **204** at said bottom end **108**.

FIG. **3** illustrates a detailed perspective view of said pulse cleaning system **100** in cross-section at said call-out **216**.

Each of said one or more exterior burner assemblies **124** can comprise a fluid delivery ring **220**, and an interior chamber strip burner **222**. Said interior chamber strip burner **222** can be aligned with and touching an inner surface **224** of side walls **210** of said outer body **102**. Said fluid delivery ring **220** can comprise a fluid cavity **226**, and said interior chamber strip burner **222** can comprise a fluid cavity **228**, as discussed below.

FIG. **4** illustrates a perspective overview of said one or more exterior burner assemblies **124**.

In one embodiment, said fluid delivery ring **220** can receive a fuel **400** from a fuel reservoir **402**, deliver said fuel **400** to said interior chamber strip burner **222** through an aperture in said side walls **210**, deliver said fuel **400** throughout said interior chamber strip burner **222**, and ignite said fuel **400** about a plurality of strip burner apertures **404** so as to create variable flame **208** within said outer body **102** directed toward a center axis **406** of said outer body **102**.

In one embodiment, said fuel **400** can be delivered to said one or more exterior burner assemblies **124** through a fuel line **408**.

FIGS. **5**A, **5**B, and **5**C illustrate a perspective overview and elevated top view of said first exterior burner assembly **124***a*.

Each among said one or more exterior burner assemblies **124** can comprise said fluid delivery ring **220**, said interior chamber strip burner **222**, one or more fuel connectors **500**, a height **502**, a width **504**, an internal diameter **506**, and an external diameter **508**.

Said interior chamber strip burner **222** can comprise an exterior surface **510**, an interior surface **512**, said plurality of strip burner apertures **404**, and one or more connector receivers **516**. In one embodiment, said exterior surface **510** can press against or be adhered to a portion of said inner surface **224** of said side walls **210**. Said one or more connector receivers **516** can comprise a threaded aperture in said exterior surface **510** for receiving and holding a portion of said one or more fuel connectors **500**. Said plurality of strip burner apertures **404** can be in a portion of said interior surface **512**.

In one embodiment, said fluid delivery ring **220** can comprise a ring having an interior diameter **518** being substantially equal to an outer diameter of said outer body **102**. Said fluid delivery ring **220** can further comprise an outer surface **520** and an inner surface **522**, relative to said center axis **406**. Said fluid delivery ring **220** can further comprise one or more connector receivers along said inner surface **522** for attaching to a portion of said one or more fuel connectors **500**, and a fuel line inlet for connecting to a portion of said fuel line **408**.

In one embodiment, said fluid cavity **228** of said interior chamber strip burner **222** can be in a fluid connection with said fluid cavity **226** of said fluid delivery ring **220** through a portion of said one or more fuel connectors **500**. Thereby, said fuel **400** can be delivered to said plurality of strip burner apertures **404** from said fuel reservoir **402**, through said fuel line **408**, through said fluid delivery ring **220**, through said one or more fuel connectors **500**, into said fluid cavity **228** of said interior chamber strip burner **222**, and out of said plurality of strip burner apertures **404**.

FIG. **6** illustrates an elevated front side view of said pulse cleaning system **100** in cross-section with an upper call-out **600** and a lower call-out **602**.

In one embodiment, said pulse cleaning system **100** can comprise an auger assembly **604** within said inner chamber **218**. In one embodiment, said auger assembly **604** can be used to catch and slow a progress of said untreated grains and pulses **120** as they progress from said top end **104** to said bottom end **108**. As is known, said auger assembly **604** can spin about said center axis **406** so as to create a slowing progressing downward chamber for said untreated grains and pulses **120** as they pass one or more of said one or more exterior burner assemblies **124**, such as said fourth exterior burner assembly **124***d in the given example*.

FIG. **7** illustrates a detailed elevated front side view of said pulse cleaning system **100** in cross-section with said upper call-out **600** and said lower call-out **602** aligned for illustrative purposes.

Each among said one or more exterior burner assemblies **124** and said interior chamber strip burner **222** can create said variable flame **208** according to an end user's preference, or according to amounts of said fuel **400** provided.

In one embodiment, said one or more air blower assemblies **126** can each comprise one or more air nozzles **700** (which can comprise a first air nozzle **700***a,* a second air nozzle **700***b,* a third air nozzle **700***c,* and a fourth air nozzle **700***d*). Wherein, said one or more air nozzles **700** can extend within said inner chamber **218** and blow air or other fluids into said untreated grains and pulses **120** as they fall, with the end goal of slowing progress or exposing said untreated grains and pulses **120** to said variable flame **208** for a longer period of time.

In one embodiment, said top end **104** can comprise said top outer edge **106** surrounding said top opening **202** with a downward sloping face **702** between said top outer edge **106** and said top opening **202** which creates a funnel shape to direct said untreated grains and pulses **120** into said inner chamber **218** through said top opening **202**.

In one embodiment, said pulse cleaning system **100** can further comprise a variable plugging assembly **704** aligned with said center axis **406** and said top opening **202**. Said variable plugging assembly **704** can comprise a base portion **706** and a top portion **708**; wherein an outward sloping face **710** can widen as it tapers down and out from said center axis **406**.

FIG. **8** illustrates a detailed cross-section elevated front side view of said pulse cleaning system **100** at said upper call-out **600** and said lower call-out **602**, with said dry commodity **122** flowing through said inner chamber **218**.

As illustrated, said dry commodity **122** can flow into said inner chamber **218** through said top opening **202**, past said one or more exterior burner assemblies **124** and said one or more center strip burners **232**, be blown and disrupted by said one or more air blower assemblies **126** with said one or more air nozzles **700**, land on auger **214**, and exit out said bottom opening **204**.

In one embodiment, said dry commodity **122** can exit said bottom opening **204** and land on said conveyor **110**. After treatment by said pulse cleaning system **100**, said dry commodity **122** can be referred to as a treated grains and pulses **212**.

FIGS. **9**A, and **9**B illustrate an elevated cross-section side view of said upper call-out **600** with said variable plugging assembly **704** in a first configuration **900** and a second configuration **902**.

In one embodiment, said variable plugging assembly **704** can be raised and lowered and thereby alter a variable gap **904** between said downward sloping face **702** and said variable plugging assembly **704** in said top opening **202**.

FIG. **10** illustrates a flow chart of a method of using a pulse cleaning system **1000**.

Benefits of flame treating grains and pulses are substantial. Tests show that a flame will kill insect and minimize the presence of alpha-toxins and pham. to single digits parts per million (approx. 4 ppm). Additionally, tests show that untreated corn can be as high as 2000 ppm, and 0 ppm after treatment.

In many cases there is a strict bar to shipping foods with insects. This is a meaningful limitation when half of the United States' pulses crop is shipped to India.

In one embodiment, a first step **1002** of said method of using a pulse cleaning system **1000** can comprise receiving said outer body **102** at said pulse cleaning system **100** at said top end **104**; a second step **1004** can comprise channeling said untreated grains and pulses **120** past said one or more exterior burner assemblies **124**; a third step **1006** can comprise removing toxins and pests from said untreated grains and pulses **120** using said variable flame **208** generated by said one or more exterior burner assemblies **124**; and a fourth step **1008** can comprise removing the dead insect carcasses from the grains for purity purposes. In one embodiment, said method of using a pulse cleaning system **1000** can further comprise monitoring said untreated grains and pulses **120** with a sensor and air blasting dead insect carcasses before they arrive at said bottom opening **204**.

For completeness, the following sentences are modeled after the claims and represent a preferred embodiment of the current application.

Said pulse cleaning system **100** for disinfecting said untreated grains and pulses **120**. Said pulse cleaning system **100** comprises said outer body **102**, said top end **104**, said top outer edge **106**, said bottom end **108**, and said conveyor **110**. Said pulse cleaning system **100** can be useful in cleaning said dry commodity **122** by inserting said dry commodity **122** into said top end **104**, cleaning said dry commodity **122** within said outer body **102**, releasing said dry commodity **122** at said bottom end **108**, and collecting said dry commodity **122** on said conveyor **110**. Said outer body **102** comprises said top opening **202** at said top end **104**, and said bottom opening **204** at said bottom end **108**. each among said one or more exterior burner assemblies **124** and said interior chamber strip burner **222** can be configured to create said variable flame **208** according to an end user's preference, or according to amounts of said fuel **400** provided. after treatment by said pulse cleaning system **100**, said dry commodity **122** can be referred to as said treated grains and pulses **212**.

Said pulse cleaning system **100** can be configured to further comprise said one or more exterior burner assemblies **124** (which comprises said first exterior burner assembly **124***a,* said second exterior burner assembly **124***b,* said third exterior burner assembly **124***c,* and said fourth exterior burner assembly **124***d*), and said one or more air blower assemblies **126** comprising at least said first air blower assembly **126***a.*

each of said one or more exterior burner assemblies **124** comprises said fluid delivery ring **220**, and said interior chamber strip burner **222**. Said interior chamber strip burner **222** can be aligned with and touching said inner surface **224** of said side walls **210** of said outer body **102**. Said fluid delivery ring **220** comprises said fluid cavity **226**, and said interior chamber strip burner **222** comprises said fluid cavity **228**, as discussed below.

Said fluid delivery ring **220** can be configured to receive said fuel **400** from said fuel reservoir **402**, deliver said fuel **400** to said interior chamber strip burner **222** through an aperture in said side walls **210**, deliver said fuel **400** throughout said interior chamber strip burner **222**, and ignite said fuel **400** about said plurality of strip burner apertures **404** so as to create said variable flame **208** within said outer body **102** directed toward said center axis **406** of said outer body **102**. Said fuel **400** can be delivered to said one or more exterior burner assemblies **124** through said fuel line **408**.

Said pulse cleaning system **100** comprises said auger assembly **604** within said inner chamber **218**. Said auger assembly **604** can be used to catch and slow a progress of said untreated grains and pulses **120** as they progress from said top end **104** to said bottom end **108**. Said auger assembly **604** can be configured to spin about said center axis **406** so as to create a slowing progressing downward chamber for said untreated grains and pulses **120** as they pass one or more of said one or more exterior burner assemblies **124**, such as said fourth exterior burner assembly **124***d* in the given example.

Said one or more air blower assemblies **126** can be configured to each comprise said one or more air nozzles

700. Said one or more air nozzles **700** can comprise at least said first air nozzle **700***a*. Said one or more air nozzles **700** can be configured to extend within said inner chamber **218** and blow air or other fluids into said untreated grains and pulses **120** as they fall. Said one or more air nozzles **700** can cause said untreated grains and pulses **120** to slow and disperse while falling through said variable flame **208**.

Said top end **104** comprises said top outer edge **106** surrounding said top opening **202** with said downward sloping face **702** between said top outer edge **106** and said top opening **202** which creates a funnel shape to direct said untreated grains and pulses **120** into said inner chamber **218** through said top opening **202**. Said pulse cleaning system **100** can be configured to further comprise said variable plugging assembly **704** aligned with said center axis **406** and said top opening **202**. Said variable plugging assembly **704** comprises said base portion **706** and said top portion **708**. wherein said outward sloping face **710** can be configured to widen as it tapers down and out from said center axis **406**.

Said variable plugging assembly **704** can be raised and lowered and thereby alter said variable gap **904** between said downward sloping face **702** and said variable plugging assembly **704** in said top opening **202**.

Said dry commodity **122** can be configured to flow into said inner chamber **218** through said top opening **202**, past said one or more exterior burner assemblies **124** and said one or more center strip burners **232**, be blown and disrupted by said one or more air blower assemblies **126** with said one or more air nozzles **700**, land on said auger **214**, and exit out said bottom opening **204**.

Said dry commodity **122** can be configured to exit said bottom opening **204** and land on said conveyor **110**.

Various changes in the details of the illustrated operational methods are possible without departing from the scope of the following claims. Some embodiments may combine the activities described herein as being separate steps. Similarly, one or more of the described steps may be omitted, depending upon the specific operational environment the method is being implemented in. It is to be understood that the above description is intended to be illustrative, and not restrictive. For example, the above-described embodiments may be used in combination with each other. Many other embodiments will be apparent to those of skill in the art upon reviewing the above description. The scope of the invention should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. In the appended claims, the terms "including" and "in which" are used as the plain-English equivalents of the respective terms "comprising" and "wherein."

The invention claimed is:

1. A pulse cleaning system for disinfecting a grains, wherein:

said grain cleaning system comprises an outer body, a top end, a top outer edge, a bottom end, and a conveyor;

said top end is configured to receive said grains;

said outer body is configured to contain and channel said grains as it falls to said bottom end;

said conveyor is configured to collect and move said grains after receiving it from said outer body;

said outer body comprises a top opening at said top end, and a bottom opening at said bottom end, and an inner chamber;

each among one or more exterior burner assemblies and an interior chamber strip burner is configured to create variable flame; and

said grain cleaning system comprises an auger assembly within said inner chamber;

said auger assembly is used to catch and slow a progress of said grains as they progress from said top end to said bottom end; and

said auger assembly is configured to spin about a center axis to create a slowing process for said grains as they pass a portion of said one or more exterior burner assemblies.

2. The grain cleaning system of claim **1**, wherein:

said one or more exterior burner assemblies comprises a first exterior burner assembly, a second exterior burner assembly, a third exterior burner assembly, and a fourth exterior burner assembly.

3. The grain cleaning system of claim **1**, wherein:

each of said one or more exterior burner assemblies comprises a fluid delivery ring, and said interior chamber strip burner;

said interior chamber strip burner is aligned with and touching an inner surface of side walls of said outer body; and

said fluid delivery ring comprises a fluid cavity, and said interior chamber strip burner comprises a fluid cavity, as discussed below.

4. The grain cleaning system of claim **3**, wherein:

said fluid delivery ring is configured to

receive said fuel from a fuel reservoir,

deliver said fuel to said interior chamber strip burner through an aperture in said side walls,

deliver said fuel throughout said interior chamber strip burner, and

ignite said fuel about a plurality of strip burner apertures so as to create said variable flame within said outer body directed toward a center axis of said outer body; and

said fuel is delivered to said one or more exterior burner assemblies through a fuel line.

5. The grain cleaning system of claim **1**, wherein:

said grain cleaning system comprises an auger assembly within an inner chamber;

said auger assembly is used to catch and slow a progress of said grains as they progress from said top end to said bottom end; and

said auger assembly is configured to spin about a center axis to create a slowing process from said top end to said bottom end; and

said auger assembly is configured to spin about a center axis to create a slowing process for said grains as they pass a portion of said one or more exterior burner assemblies.

6. The pulse cleaning system of claim **1**, wherein:

said grain cleaning system further comprises one or more air blower assemblies each comprising one or more air nozzles extending into said inner chamber;

said one or more air nozzles comprise at least a first air nozzle;

said one or more air nozzles extended into said inner chamber to blow air that disrupt and slow the fall of said grains;

said air nozzles are configured to produce a dispersive airflow to disrupt and slow said grains;

said one or more air nozzles cause said grains to slow and disperse while falling through said variable flame;

one or more burners are configured to create heat in conjunction with air nozzles that direct airflow to expose said grains to heat for a prolonged period while slowing their descent;

said grain cleaning system is configured to treat said grains while falling by

exposing said grains to heat generated by said burners, and

agitating and slowing said grains using an airflow from said one or more air nozzles within said inner chamber.

7. The pulse cleaning system of claim **1**, wherein:

said top end comprises said top outer edge surrounding said top opening with a downward sloping face between said top outer edge and said top opening which creates a funnel shape to direct said grains into said inner chamber through said top opening;

said grain cleaning system is configured to further comprise a variable plugging assembly aligned with a center axis and said top opening;

said variable plugging assembly comprises a base portion and a top portion; and

an outward sloping face is configured to widen as it tapers down and out from said center axis.

8. The pulse cleaning system of claim **7**, wherein:

said variable plugging assembly is raised and lowered and thereby alter a variable gap between said downward sloping face and said variable plugging assembly in said top opening.

9. The pulse cleaning system of claim **1**, wherein:

said grains is configured to

flow into said inner chamber through said top opening, past said one or more exterior burner assemblies and one or more center strip burners,

be blown and disrupted by said one or more air nozzles, land on auger assembly, and

exit out said bottom opening.

10. The grain cleaning system of claim **1**, wherein:

said grains is configured to exit said bottom opening and land on said conveyor.

11. The grain cleaning system of claim **6**, wherein:

each among said one or more burners comprise said one or more air nozzles are arranged below said one or more burners within said inner chamber;

said one or more air nozzles are configured to direct airflow upward toward said one or more burners; and

said upward airflow is configured to slow and suspend said grains in proximity to said one or more burners, thereby increasing the exposure of said grains to heat generated by said burners.

12. The grain cleaning system of claim **6**, wherein:

said one or more air nozzles are configured to blow air and fluids into said inner chamber.

13. A grain cleaning system for disinfecting grains, wherein:

said grain cleaning system comprises an outer body, a top end, a top outer edge, a bottom end, and a conveyor;

said top end is configured to receive said grains;

said outer body is configured to contain and channel said grains as it falls to said bottom end;

said conveyor is configured to collect and move said grains after receiving it from said outer body;

said outer body comprises a top opening at said top end, a bottom opening at said bottom end, and an inner chamber;

each among one or more exterior burner assemblies and an interior chamber strip burner is configured to create variable flame; and

said grain cleaning system further comprises one or more air blower assemblies each comprising one or more air nozzles extending into said inner chamber;

said one or more air nozzles comprise at least a first air nozzle;

said one or more air nozzles extend into said inner chamber to blow air that disrupt and slow the fall of said grains;

said air nozzles are configured to produce a dispersive airglow to disrupt and slow said grains;

said one or more air nozzles cause said grains to slow and disperse while falling through said variable flame;

one or more burners are configured to create heat in conjunction with air nozzles that direct airflow to expose said grains to heat for a prolonged period while slowing their descent;

said grain cleaning system is configured to treat said grains while falling by

exposing said grains to heat generated by said burners, and

agitating and slowing said grains using an airflow from said one or more air nozzles within said inner chamber.

14. The grain cleaning system of claim **13**, wherein:

each among said one or more burners comprise said one or more air nozzles are arranged below said one or more burners within said inner chamber;

said one or more air nozzles are configured to direct airflow upward toward said one or more burners; and

said upward airflow is configured to slow and suspend said grains in proximity to said one or more burners, thereby increasing the exposure of said grains to heat generated by said burners.

15. A method of use of a grain cleaning system, comprising:

receiving said grains into a top end of an outer body of said grain cleaning system, channeling said grains past one or more exterior burner assemblies,

removing toxins and pests from said grains using a variable flame generated by said one or more exterior burner assemblies, and

removing the dead insect carcasses from said grains for purity purposes;

wherein,

said grain cleaning system comprises said outer body, a top end, a top outer edge, a bottom end, and a conveyor;

said top end is configured to receive said grains;

said outer body is configured to contain and channel said grains as it falls to said bottom end;

said conveyor is configured to collect and move said grains after receiving it from said outer body;

said out body comprises a top opening at said top end, a bottom opening at said bottom end, and an inner chamber;

each among said one or more exterior burner assemblies and an interior chamber strip burner is configured to create said variable flame; and

said grain cleaning system comprises an auger assembly within said inner chamber;

said auger assembly is used to catch and slow a progress of said grains as they progress from said top end to said bottom end; and

said auger assembly is configured to spin about a center axis to create a slowing process for said grains as they pass a portion of said one or more exterior burner assemblies.

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