United States Patent [19]

Jones

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[54] **ARTIFICIAL TURF CLEANER**

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[52] **U.S. Cl.** **15/314;** 15/321; 15/340; 15/354

[51] **Int. Cl.** **A47l 7/00**

[58] **Field of Search** 15/314, 320, 321, 340, 15/354, 381

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Assistant Examiner—C. K. Moore
Attorney, Agent, or Firm—Bailey & Dority

[57] **ABSTRACT**

A portable device for cleaning artificial turf which utilizes a cleaning head having a suction nozzle and spray nozzles which is pulled behind a motorized utility vehicle. A truck is parked adjacent the edge of the field upon which the artificial turf is located and contains a vacuum pump, water heater, pressure booster chemical injection systems, and an electrical system which supplies the utility vehicle with hot cleaning medium and suction for removing the spent cleaning solution through the nozzle pulled thereby. A swivel is provided adjacent the cleaning head for supporting a large suction hose above the cleaning head so that the utility vehicle can be readily driven about the field.

3 Claims, 6 Drawing Figures

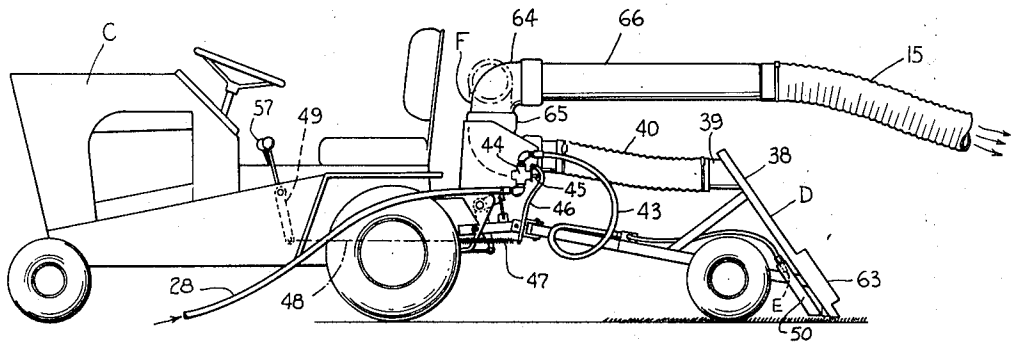


Fig. 1.

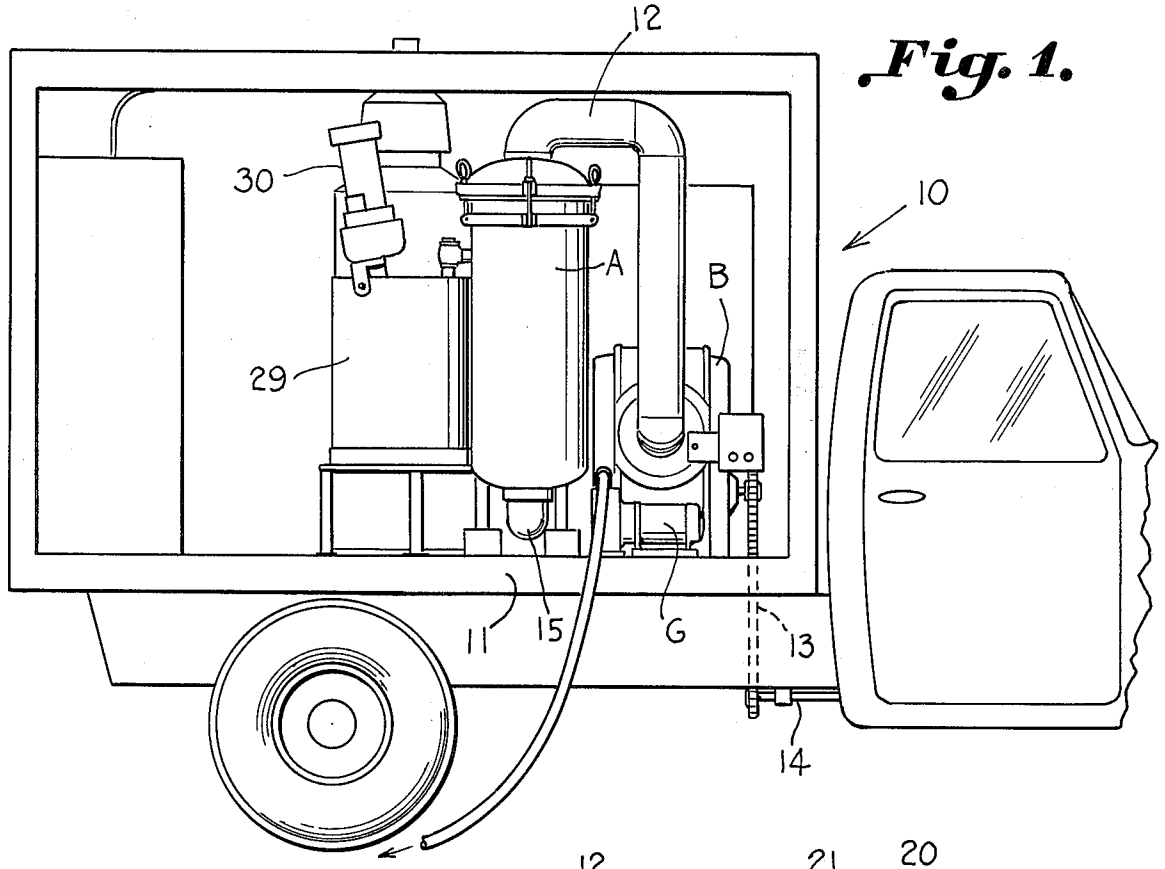
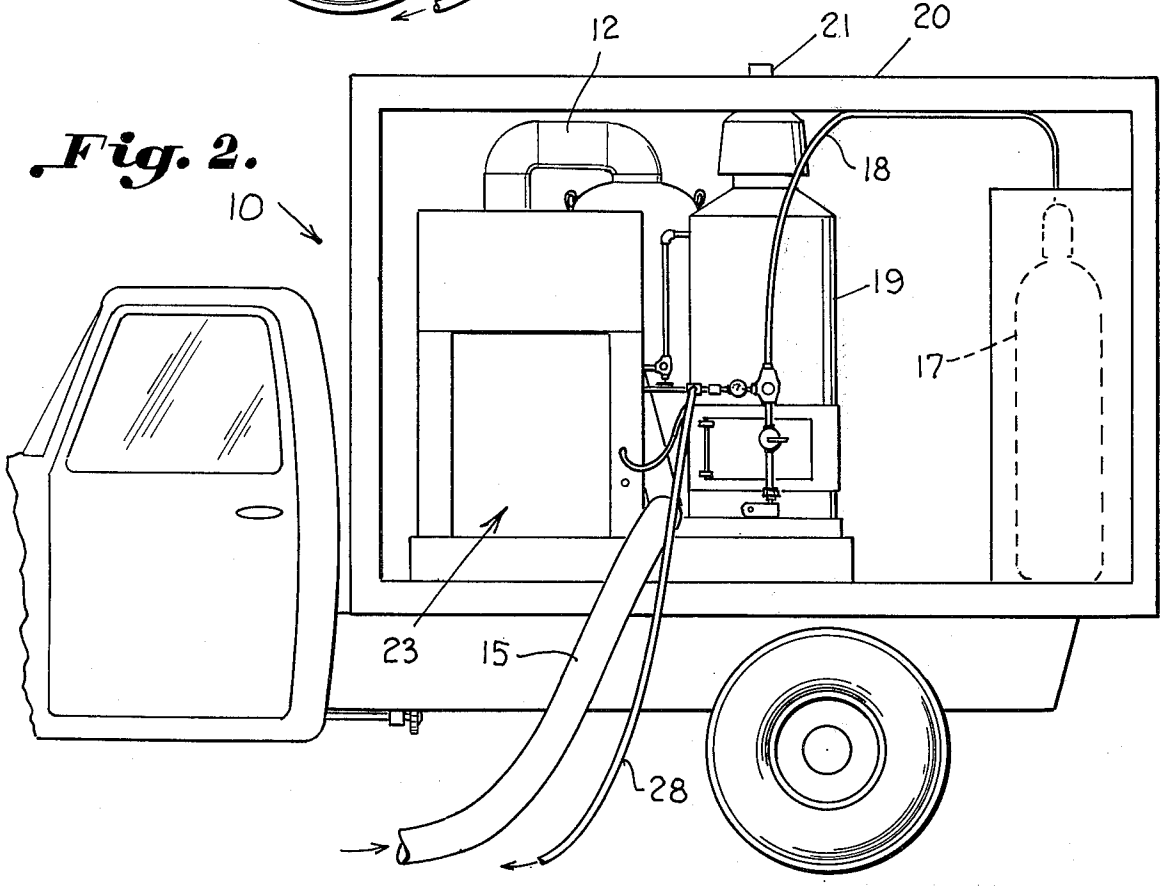


Fig. 2.



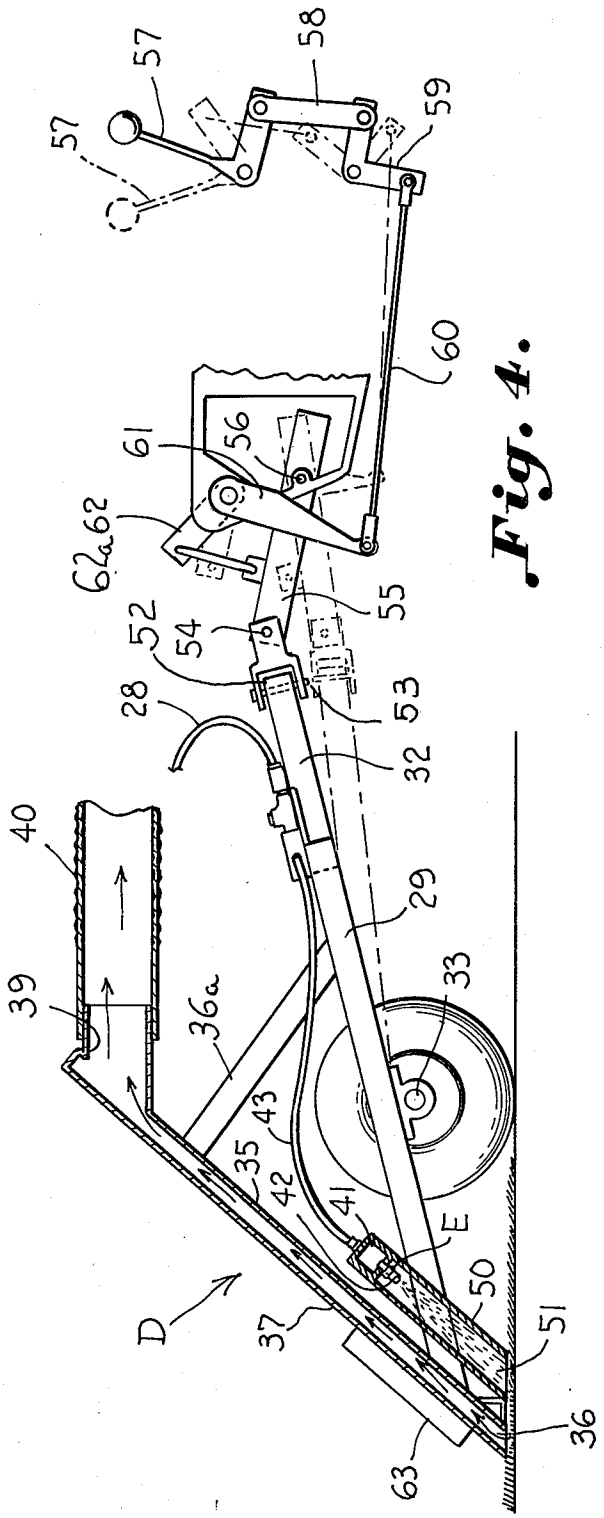

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62a
62
55
52
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53
28
32
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36a
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35
42
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E
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D
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Fig. 4.

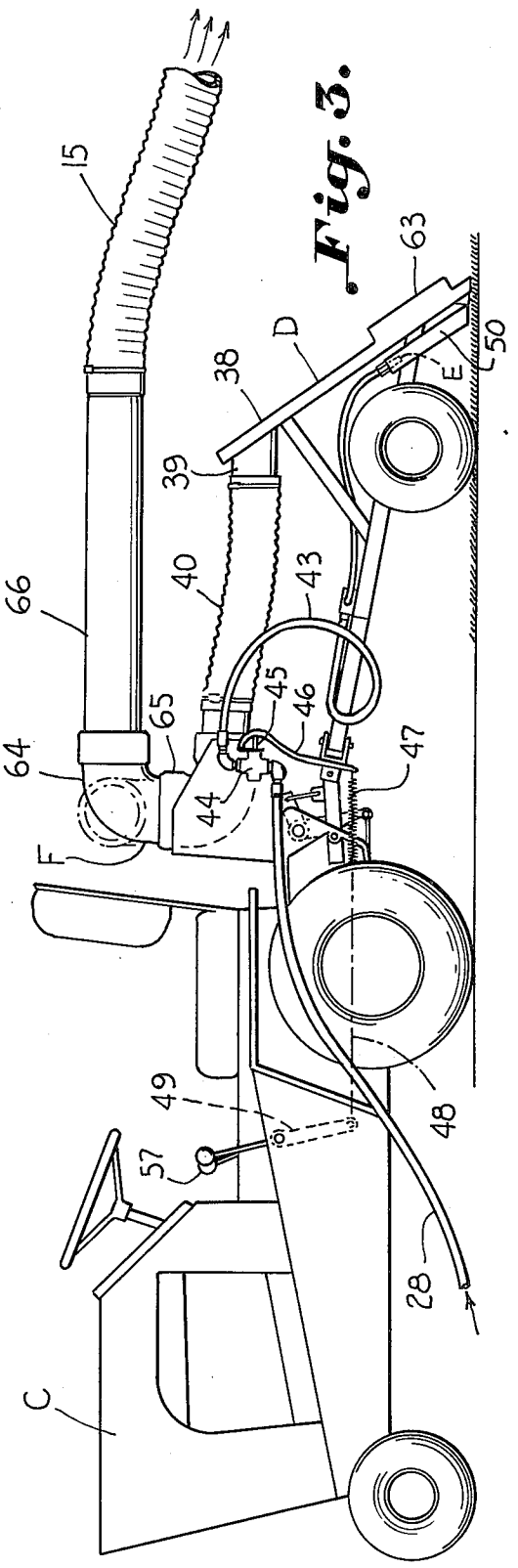

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63
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Fig. 3.

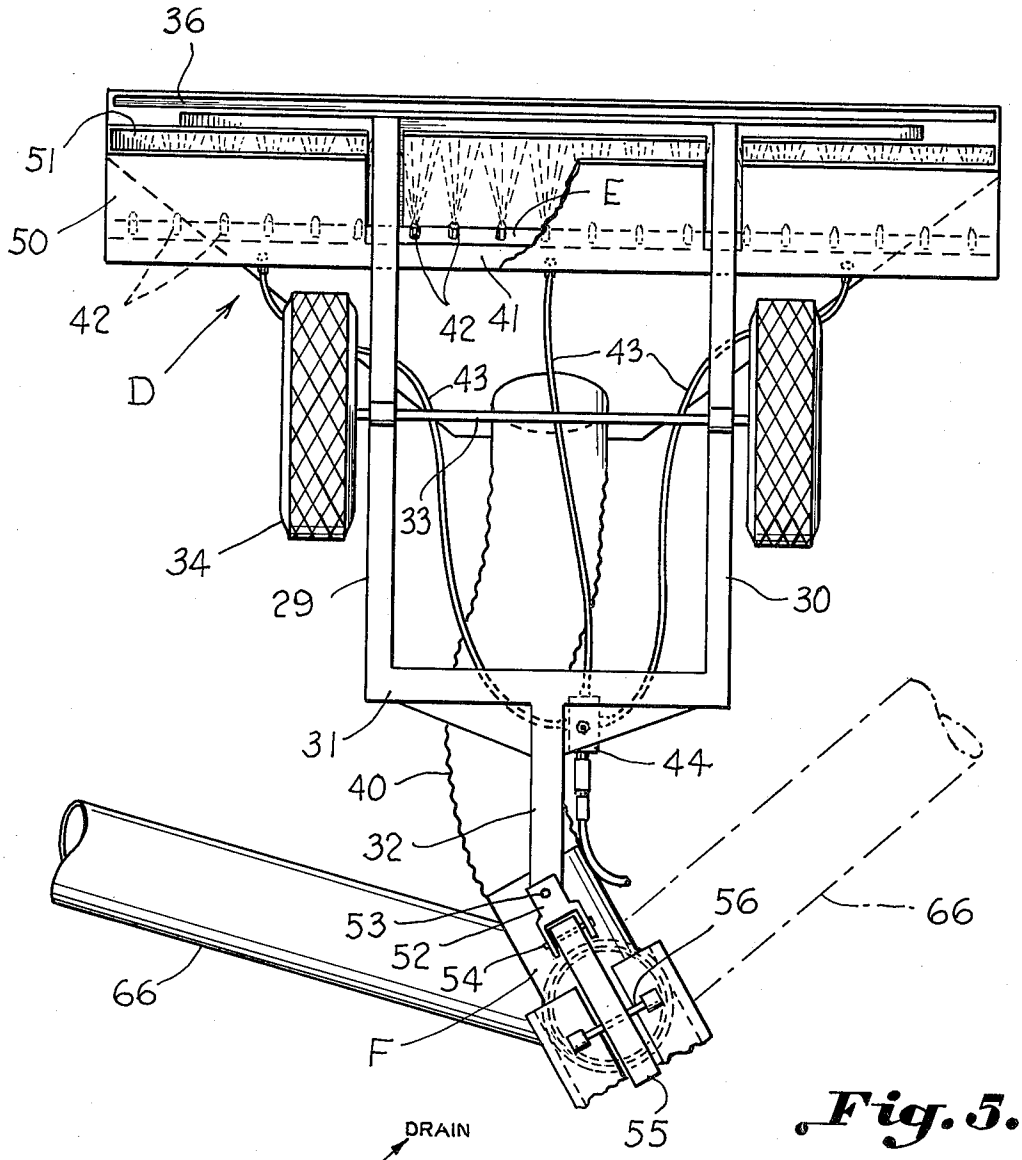

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Fig. 5.

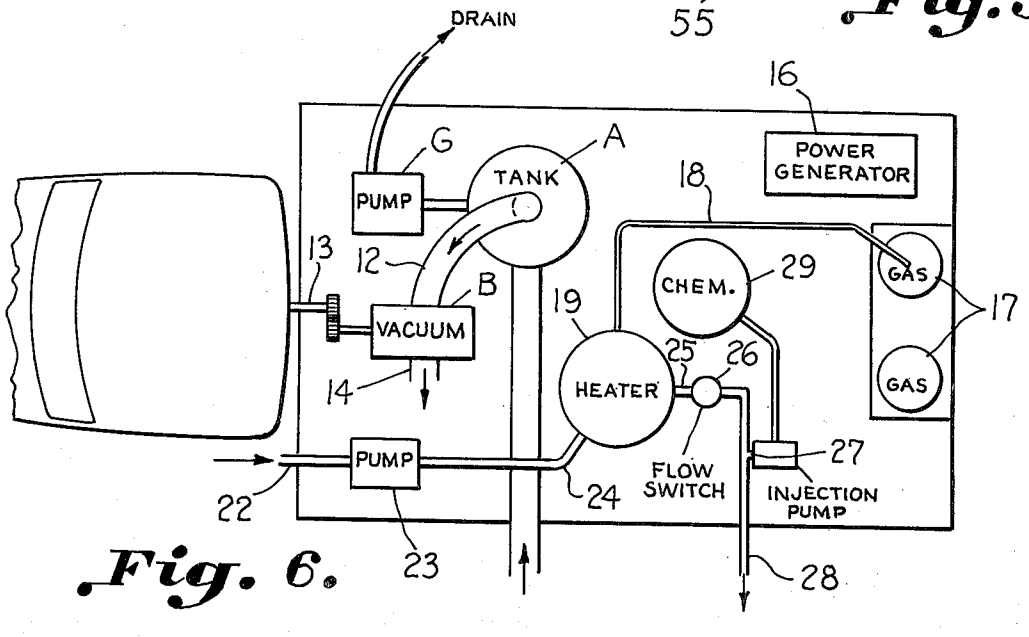

DRAIN
16
POWER GENERATOR
G
A
TANK
PUMP
18
13
12
B
VACUUM
14
CHEM.
29
GAS
17
19
25
26
HEATER
GAS
PUMP
22
23
24
FLOW SWITCH
27
INJECTION PUMP
28

Fig. 6.

ARTIFICIAL TURF CLEANER

This invention relates to a cleaning apparatus, and more particularly to an apparatus designed for cleaning large fields having artificial turf thereon.

In recent years artificial turf on football fields, tracks, etc., has become very popular due to the low maintenance and uniformity. One of the problems encountered with such field, particularly in areas of high pollution, is that foreign matter, such as oily fallout, soot, broken glass, and other hazardous materials collect on the artificial turf. The oily fallout and soot make the artifical turf slippery creating hazardous conditions for athletes utilizing the field. The glass and other matter collecting on the field, of course, would also be injurious to the athletes.

Furthermore, as the foreign matter collects on the field, bacteria and the like tend to increase, possibly infecting skinned elbows and knees of the athletes.

Another problem that arises with the use of such artificial turf fields is that after heavy rains water will tend to collect in puddles hindering the ability of the athletes running thereon.

Accordingly, it is an important object of the present invention to provide a portable device for cleaning large areas having artificial turf and the like thereon.

Another important object of the present invention is to provide a motorized cleaning apparatus which is capable of traversing a large field having artificial turf thereon with a minimum of interference from water and suction hoses accompanying such.

Another important object of the present invention is to provide a motorized cleaning device with a cleaning head for cleaning outdoor fields having artificial turf thereon, which encloses the hot cleaning medium being sprayed on the turf for minimizing the temperature drop therein.

Other objects and advantages of this invention will become more apparent from a reading of the following detailed description and appended claims taken in conjunction with the accompanying drawings wherein:

FIG. **1** is a side elevational view of a supporting vehicle for the portable cleaning device,

FIG. **2** is a side elevational view taken from the other side of the supporting vehicle shown in FIG. **1**,

FIG. **3** is a side elevational view illustrating the motorized utility cleaning vehicle,

FIG. **4** is an enlarged side elevational view, partially in section, illustrating a cleaning head utilized with the motorized utility vehicle,

FIG. **5** is an enlarged plan view taken from the bottom illustrating a cleaning head constructed in accordance with the present invention,

FIG. **6** is a schematic plan view illustrating the location of the various components on the service truck and the flow of air and cleaning medium therethrough.

Referring in more detail to the drawings, there is illustrated a portable device for cleaning artificial turf on athletic fields and the like, utilizing a cleaning medium. The device includes a tank A with a vacuum hose having one end coupled to and communicating with the tank A. A vacuum pump B communicates with the tank A causing a large volume of air to be drawn through the hose. A motorized utility vehicle C carries the other end of the vacuum hose for traversing the athletic field. An elongated transverse cleaning head D is carried by the motorized vehicle C with a suction nozzle forming a part thereof. The suction nozzle communicates with

the other end of the vacuum hose circulating air in large volume through the nozzle and the tank A. A sprayer means E is carried adjacent the suction nozzle for spraying hot cleaning medium on the turf ahead of the suction nozzle as the head is passed across the turf. A housing encompasses the sprayer means E and has an elongated opening closely adjacent the turf for encasing the hot cleaning medium as the cleaning medium is sprayed on the turf for minimizing the temperature lost during the cleaning operation. A swivel support F is carried by the motorized vehicle C for supporting the vacuum hose in order to permit the vehicle to turn under the hose as such traverses the field. A means G communicates with the base portion of the tank for conveying away the liquid and any foreign matter removed from the turf.

The tank A and vacuum pump B are carried on the support vehicle, generally designated by the reference character **10**, which has a covered flat bed body **11** carried on the rear thereof. Normally, the support vehicle **10** is driven on the athletic field and parked adjacent the central side line. The motorized vehicle C then begins to clean outwardly therefrom. It has been found in some instances that it is not desirable to drive the heavy motorized vehicle onto the artificial turf since it may pack down some of the cushioning used thereunder.

The vacuum tank A is an upright tank provided by receiving the spent cleaning solution collected from the field being cleaned. Communicating with the top of the vacuum tank B is a vacuum hose **12**, which extends to the input of the vacuum pump B. The vacuum pump B is a positive displacement pump which is driven by a power take-off **13** coupled to the drive shaft **14** of the support vehicle. Therefore, the engine of the support vehicle **10** is used for driving the vacuum pump B. The exhaust from the vacuum pump B is vented out below the truck through a hose **14***a*. The pump G is connected to the bottom of tank A by conduit **12***a* for removing the collected fluid therefrom.

Communicating with the bottom of the tank A is an elongated vacuum hose **15** which extends to the cleaning head D carried by the motorized vehicle C. This vacuum hose **15**, in one particular instance is **200** feet long so that when the support vehicle is parked adjacent the central side lines of a normal football field the motorized vehicle can clean outwardly therefrom to cover substantially all of the artificial turf. The support vehicle **10** as shown in FIG. **6**, is self contained and includes a gasoline operated power generator **16** which generates electric power for operating various pumps in the system. It is also provided with tanks **17** of propane gas which is fed by a tube **18** to a gasoline operated heater **19** which heats the water used in cleaning the field. The heater **19**, as shown, is vented through the top **20** of the truck by means of a chimney **21**.

Cold water is supplied to line **22** shown in FIG. **6** from any suitable source on the field being cleaned and is fed through an electrically operated pressure booster pump **23** which builds the pressure of the water to approximately **200** pounds per square inch. This pressurized water is fed through piping **24** to the heater **19** where it is heated to approximately **180°** Fahrenheit. The water is fed from the heater by piping **25** through a flow control switch **26**, a chemical injection pump **27**, through hose **28** to the cleaning head D carried on the motorized vehicle C.

The chemical injection pump **27** is provided for injecting any suitable conventional chemical into the stream of pressurized water flowing through the hose **28.** A supply of chemical, if in the form of powder, is mixed with water in tank **29***a* by a motorized blender **30***a*. Electric power for operating the blender **30***a*, the pressure boosting pump **23,** the injection pump **27,** the exhaust pump G, and the flow control switch **26** is provided by the power generator **16.**

The motorized vehicle C may be any suitable conventional utility vehicle, such as generally used for mowing large areas, or it may be a conventional general purpose tractor that has a hitch connection suitable for pulling the cleaning head D. The cleaning head D is carried by a frame member which includes a pair of spaced supporting frame members **29** and **30,** respectively, which are joined by a cross-member **31** that, in turn, has welded thereto a tongue **32.** An axle **33** is journalled on the frame members **29** and **30** and has wheels **34** carried thereon for transporting the cleaning head. The inner end of the supporting members **29** and **30** is welded to a back plate **35** of the suction nozzle. Upwardly extending braces **36***a* are also provided between the members **29** and **30** and the back plate **35** of the suction nozzle. Spaced from the back plate **35** so as to define a nozzle **36** is a front plate **37.** The back and front plates **35** and **37** are triangular in shape and extend upwardly from adjacent the elongated slotted nozzle provided therebetween adjacent the bottom. The plates **35** and **37** are joined by side walls **38** to provide a closure. Welded adjacent the top of the back plate **35** is a pipe **39** to which a flexible **6** inch vacuum hose **40** is connected. The other end of the flexible vacuum hose **40** is coupled to a lower end of a swivel support F.

The sprayer means E includes an elongated tubular member **41** which has spray nozzles **42** spaced therein. Cleaning medium is supplied to the elongated tubular member **41** and the nozzles **42** by piping **43** which communicates with the tubular member. The other end of the piping **43** is connected to a valve **44** which can be selectively opened and closed to supply the cleaning medium to the nozzles **42.** The valve **44** has a control plunger **45** which is activated by an elongated arm **46** which has its lower end attached by means of a spring **47** to a cable **48** which is, in turn, connected to a lever **49.** By manipulating the lever **49** the control valve **44** can be selectively opened and closed. As can be seen in FIGS. **4, 5** and **6,** the plurality of nozzles **42** are carried within an enclosure **50** which has an elongated opening **51** adjacent the bottom thereof for allowing the sprayed cleaning medium to be sprayed directly ahead of the suction nozzle **36.** It is desired to enclose the sprayed cleaning medium within the housing **50** until such is closely adjacent the artificial turf being cleaned so as to minimize the temperature drop between the spray nozzles **42** and the artificial turf. Generally, the hotter the cleaning solution the better the cleaning action. Normally, the cleaning medium is heated to approximately **180°** by the hot water heater **19** carried on the support vehicle **10.**

The means for selectively raising and lower the cleaning head D from a cleaning position to a transporting position includes a swivel joint **52** which is pivotally connected by means of a bolt **53** to the tongue **32** of the frame upon which the cleaning head D is supported. A transverse pin **54** is provided between bifurcated ends of the swivel **52** for coupling the tongue **32** to an elongated bar-type member **55** carried on the motorized vehicle. A pin **56,** which is supported on the frame of the motorized vehicle **10,** extends through the bar-type member **55** for allowing such to be pivoted from the full line position shown in FIG. **4** to the phantom line position. A conventional linkage mechanism including control handle **57,** linkage members **58,** dog leg **59,** rod **60,** arms **61, 62** and **62***a* are provided for raising and lowering the elongated member **55** responsive to moving the handle **57** from the full line position to the phantom line position. Such raises and lowers the tongue **32** so as to permit the lower end of the cleaning head to either rest on the artificial turf being cleaned or be raised off of the artificial turf to a transporting position. It is noted that the frame members **29** and **30** pivot about the axle **33** when the cleaning head is raised and lowered. It is desirable that the cleaning head during the cleaning operation bear down heavily on the artificial turf. An elongated iron weight **63** is carried on the front plate **37** of the cleaning head for increasing the weight imparted to the artificial turf by the cleaning head.

In order to permit the motorized vehicle to traverse the field being cleaned without interferring with the vacuum hose **15** or the water hose **28,** the swivel support F is provided. The uppper end of the swivel support F includes an elbow **64** which is journalled in a lower elbow **65** to which the vacuum hose **40** is coupled. Extending out of the upper elbow **64** is a metallic tubular member **66** to which the vacuum hose **15** is coupled. Normally, in operation the water hose **28** is attached to the tubular metallic hose **66** so that the vacuum hose and the water hose pass over the cleaning head as the motorized vehicle is turned around.

The flow switch **26** coupled to the output of the heater **19** cuts the pressure boosting pump **23** and the injection pump **27** off responsive to closing the valve **44.**

Normally, the turf cleaner is utilized in cleaning fields. However, it is understood that it can also used for removing water from playing fields.

While a preferred embodiment of the invention has been described using specific terms, such description is for illustrative purposes only, and it is to be understood that changes and variations may be made without departing from the spirit or scope of the following claims.

What is claimed is:

1. A portable device for cleaning an artificial turf athletic field and removing a liquid therefrom, having a tank positionable at a marginal portion of said field comprising: a vacuum hose having one end coupled to and communicating with said tank, a vacuum pump communicating with an upper portion of said tank for rapidly evacuating air from said tank causing a large volume of air to be drawn through said hose, a motorized utility vehicle carrying the other end of said vacuum hose for traversing said athletic field, an elongated transverse cleaning head carried by said motorized vehicle, a suction nozzle carried by said cleaning head and communicating with the other end of said vacuum hose, a swivel support carried by said motorized vehicle carrying said vacuum hose permitting the vehicle to turn for changing direction under the hose for traversing said athletic field, and means communicating with a base portion of said tank for conveying away the liquid and any foreign matter removed from the turf.

2. The structure set forth in claim 1 including, a cleaning medium source, a sprayer means carried adjacent said cleaning head and connected to said source for spraying said cleaning medium on said turf ahead of said suction nozzle as the head is passed across the turf.

3. A portable device for cleaning an artificial turf athletic field with a liquid cleaning medium applied thereto comprising: a support vehicle, a tank carried by said support vehicle, a vacuum hose having one end coupled to and communicating with said tank, a vacuum pump communicating with said tank for rapidly evacuating air from said tank causing a large volume of air to be drawn through said hose, a motorized utility vehicle carrying the other end of said vacuum hose for traversing said athletic field, an elongated transverse cleaning head carried by said cleaning head and communicating with the other end of said vacuum hose circulating air in large volume through the nozzle and the tank, a swivel support carried by said motorized vehicle carrying said vacuum hose permitting the vehicle to turn for changing direction with a minimum of interference from the hose for traversing said athletic field, a pressurized source of hot water, a source of cleaning agent, means for mixing said cleaning agent with said hot water producing a pressurized cleaning medium, means for conveying said cleaning medium to a sprayer means carried adjacent said cleaning head for spraying said cleaning medium on said turf ahead of said suction nozzle as said head is passed across the turf, and means communicating with a base portion of said tank for conveying away the used cleaning medium and foreign matter removed from the turf.

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