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Hahn

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[54] **SOIL DRIER**

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[51] **Int. Cl.** **A01b 77/00**

[58] **Field of Search** 47/1, 1.42; 111/6, 111/7; 126/271.1, 271.2, 271.3, 19.5, 343.5; 37/12, 19

[56] **References Cited**

UNITED STATES PATENTS

2,950,566	8/1960	Henry	47/1.42
3,126,883	3/1964	Smith	126/343.5 R
3,140,708	7/1964	Petlak et al.	126/343.5 R
3,327,659	6/1967	Nolan et al.	126/343.5 R X
3,404,470	10/1968	Raiti	37/12
3,259,123	7/1966	Sangivanni	126/343.5 R
3,304,632	2/1967	Kotlar et al.	126/343.5 R
1,773,444	8/1930	Brady	37/12

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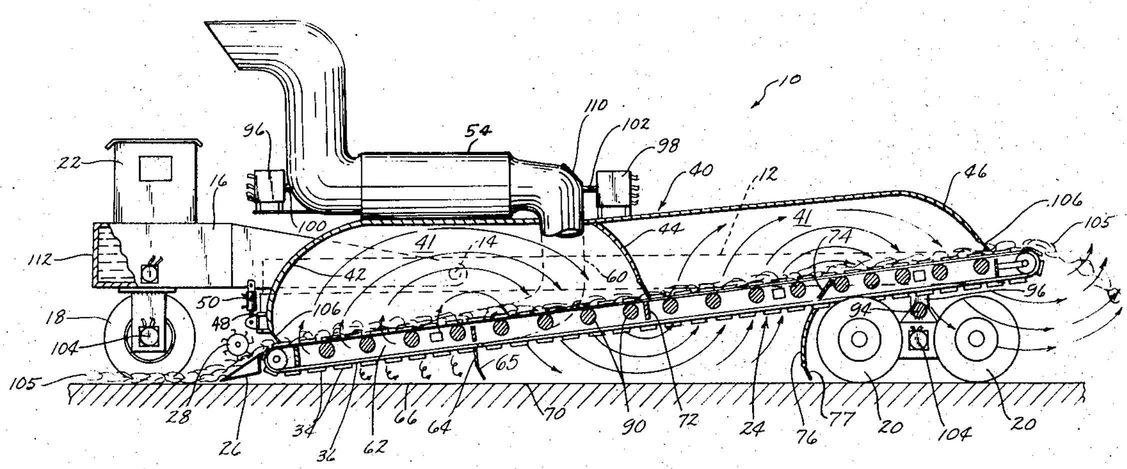
[57] **ABSTRACT**

A machine having a continuous conveyer with a scoop at its forward end and a jet engine supplies hot air at 600° F. and 600 miles per hour to the conveyer. The hot air from the engine is directed back and forth through the dirt being conveyed and the conveyer approximately five times. Hydraulic motors and power cylinders are driven by the jet engine for moving the machine and raising and lowering the conveyer and scoop. A rototiller may be placed in proximity of the scoop for pulverizing the soil.

10 Claims, 4 Drawing Figures



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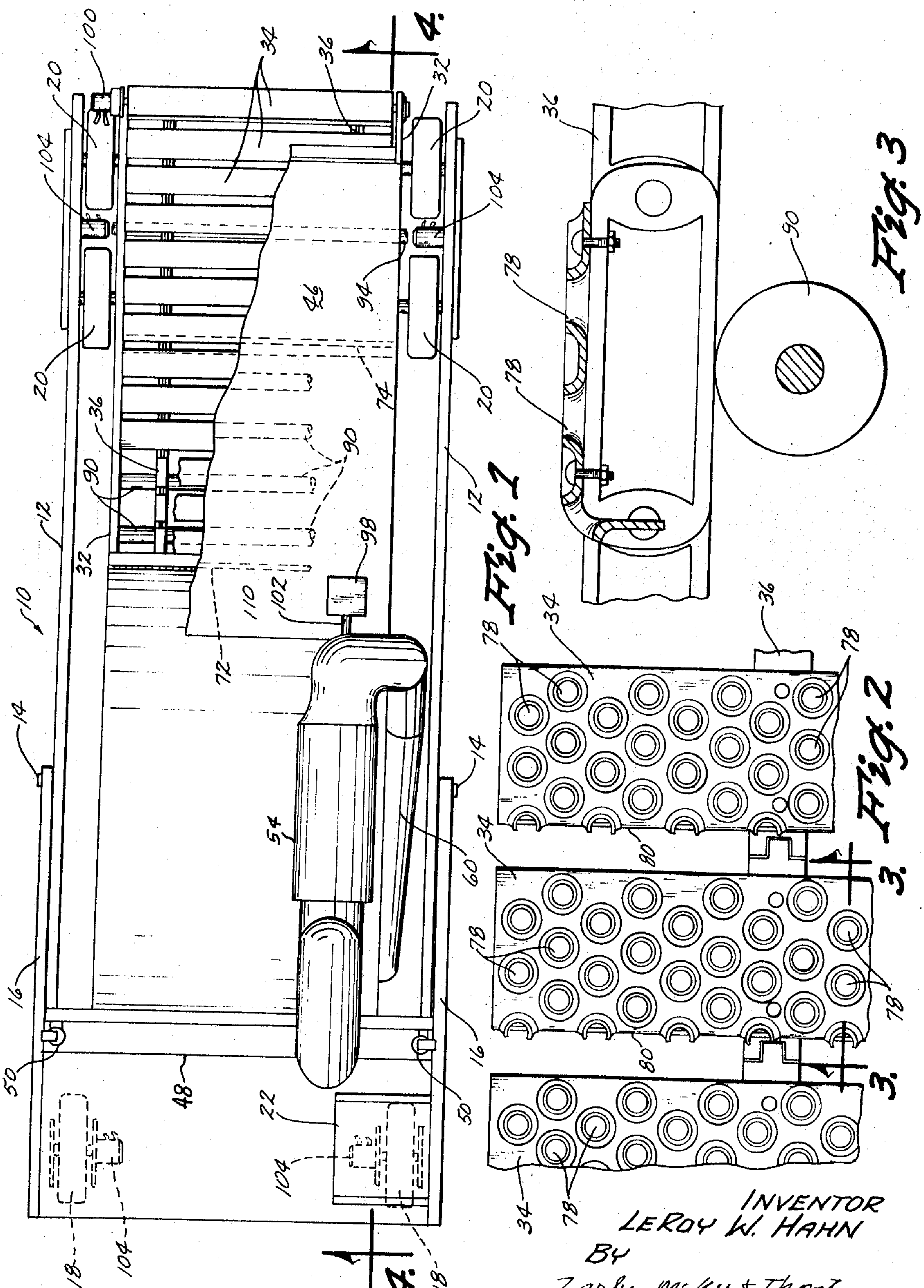

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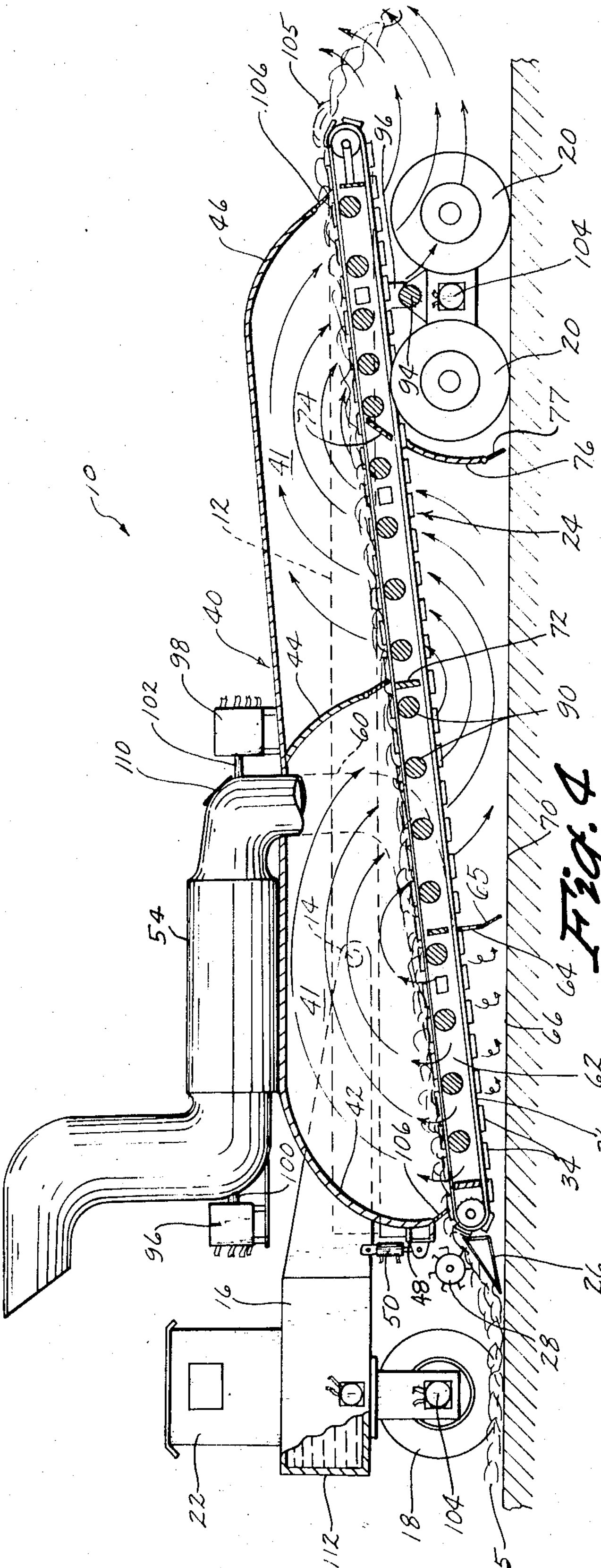

Fig. 4

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SOIL DRIER

Projects involving working with dirt are frequently delayed by unsuitable ground conditions due to excessive moisture. Typical projects where delays are encountered are earthen dam fill construction projects, roadway embankment construction, and airport runway building projects. Any project requiring earth to be placed and compacted in accordance with moisture density control specifications can utilize this machine for removing the excess moisture.

The use of this machine will extend the working season by allowing an earlier start in the spring and a later finish in the fall. This machine will allow rapid drying of the soil so that it can be compacted immediately before rains or snows. Soils that are compacted conforming to the moisture density control specifications repel water many times better than loose soils or soils compacted with excessive moisture content.

Another use of this machine is for snow removal and thus the snow may be melted and the resulting water may be run into drains.

The use of a jet engine for supplying the heat also provides the power for moving the self-propelled machine and operating other equipment including the conveyer. Also the directing of air rearwardly will allow the machine to be jet-propelled forwardly for transport purposes.

The passing of the air at temperatures on the order of 600° F. at 500 to 700 miles per hour approximately to a degree suspends the dirt particles to maximize air contact. The passage of the air on the order of four times back and forth through the soil as it is conveyed along the conveyer and once after it leaves the conveyer assures that it is dried to the desired moisture content. The ground under the conveyer cooperates with the enclosure around the conveyer to channel the air back and forth through the conveyer and the material being conveyed.

This invention consists in the construction, arrangements and combination of the various parts of the device, whereby the objects comtemplated are attained as hereinafter more fully set forth, specifically pointed out in the claims, and illustrated in the accompanying drawings in which:

FIG. 1 is a fragmentary top plan view of the soil drying machine of this invention;

FIG. 2 is a fragmentary enlarged plan view of the conveyer and individual flights thereon;

FIG. 3 is a cross sectional view taken along line 3—3 in FIG. 2;

FIG. 4 is a cross sectional view taken along line 4—4 in FIG. 1.

The drying machine of this invention is referred to in FIG. 4 generally by the reference numeral **10** and includes a frame structure having forwardly extending frame side portions **12** pivotally connected by pins **14** to rearwardly extending side frame portions **16**. The vehicle is steered by wheels **18** carried on the forward side frames **16** while the rear side frames **12** are carried on rear wheels **20**. An enclosure **22** is provided at the forward end for the operator of the machine.

An elongated continuous conveyer **24** is provided wth a scoop **26** at its forward end below a rototiller **28** and material **105** such as soil is fed onto the conveyer to be discharged at the rear with the moisture removed as seen in FIG. 4. The conveyer **24** includes side channels **32** which function as a supporting frame for the flighting **34** interconnected by side chains **36**.

An enclosure **40** extends over the conveyer **24** and has opposite side walls **41** extending to the ground and arcuate wall portions **42, 44** and **46**, terminating at their lower ends closely adjacent the conveyer to provide air flow passageways back and forth through the conveyer. A transversely extending cross frame member **48** is connected to the enclosure **40** at its forward end and is connected to a pair of lifting cylinders **50** connected at their upper ends to the forward side frames **16** such that the conveyer is raised and lowered as the rear side frame members **12** pivot up and down upon operation of the lift cylinders **50**. The pivotal movement occurs about the pivot axis **14** where the front and rear side frame members **16** and **12**, respectively, are interconnected.

A jet engine **54** of conventional design such as a J–47 is integrally supported on the enclosure **40** carried by the rear side frames **12** and a conduit **60** is in communication with a forward drying manifold **62** between the upper and lower flighting on the conveyer **24**. A downwardly extending pivotal wall assembly **64** including a pivotal flap **65** forms a chamber **66** below the conveyer and above the ground **70** such that air fed into the manifold **62** will be forced upwardly as indicated by the arrows in FIG. 4 and the curvature of the enclosure wall **42** forces the air rearwardly and back through the conveyer against the ground and back up again between compartment walls **72** and **74** and the downwardly extending wall **76** including a pivotal flap **77** whereupon the air is then again directed downwardly again by the rear enclosure wall **46** where the air passes again through the conveyer and out the rear of the machine. Thus the air has passed through the moist soil four times and may also pass through the soil again as it is being ejected from the rear of the machine as seen in FIG. 4.

The conveyer flights **34** as seen in FIGS. 2 and 3, have a roughened surface formed by a plurality of upstanding truncated cone formations **78**. Thus the air under pressure is forced back and forth through the conveyer **24** through the cone formations **78** and the space **80** between conveyer flights **34**.

The conveyer flighting is further supported by longitudinally spaced apart rollers **90** connected at their ends to the side channels **32**. The tandem wheels **20** are pivoted together about an axle **94** connected to a post **96** connected to the rear side channels **12**.

The jet engine **54** powers a pair of forwardly and rearwardly disposed hydraulic pumps **96** and **98** by driving shafts **100** and **102** respectively. These pumps are then connected to hydraulic motors **104** at the front and rear wheels for moving the machine forwardly. The pump **96** is also connected to the lift cylinders **50** for raising and lowering the unit relative to the ground. Then the pump **98** is connected to a hydraulic motor **100** for turning the conveyer **24**.

Thus it is seen in operation that the soil **105** on the ground **66** is picked up by the scoop **26** and is pulverized if necessary by the rototiller **28** whereupon it is moved onto the conveyer **24** past a downwardly extending forward yieldable gate **106** on the lower end of the enclosure wall **42**. The soil **105** continues to move along the conveyer past the gate assembly on the lower end of wall enclosure wAll **44** and lastly past the yieldable gate **106** on the lower end of the rear enclosure wall **46** whereupon the soil **104** is discharged from the machine in a dried condition. The air from the jet engine is channeled to the conveyer where it is forced upwardly and then again downwardly by the enclosure wall **44** against the ground and then back upwardly by the enclosure wall **76** whereupon it is returned through the conveyer by the rear enclosure wall **46** and then out of the machine and to some extent back through the dirt being discharged from the conveyer. This multiple exposure to hot air on the order of five times during its ride on the conveyer and as it leaves the conveyer assures maximum drying of the soil allowing it to be worked immediately when returned to the ground. It is noted that the harder the jet enging works to move the machine forwardly and engine power the other equipment the hotter the air produced will be thus resulting in faster drying capabilities. It is further understood that this machine may be used for melting snow, if desired.

When the machine is moved in transport, a gate **110** at the rear of the net engine may be opened to allow the jet blast to move rearwardly thus propelling the machine forwardly. A supply of fuel **112** is carried over the forward wheels **18.**

I claim:

1. A soil drying machine comprising,

an elongated frame having a scoop at its forward end,

a material conveyer on said frame extending from said scoop the substantial length of said frame, said material conveyer including openings for passing air therethrough, and said scoop adapted to engage the ground with said conveyer being above the ground,

a pressurized hot air source,

said frame incuding a series of alternating upwardly and downwardly extending walls for forming air flow passageways back and forth through said conveyer throughout its length, and said pressurized hot air source being connected to said air flow passageways, and

an air outlet being provided at the rear end of said conveyer, and an enclosure wall extending over said conveyer and enclosure side walls extending to the ground below said conveyer, and said upwardly and downwardly extending walls cooperate with said enclosure walls and the ground to define said air flow passageways for directing said hot air back and forth through said conveyer and material thereon.

2. The structure of claim **1** wherein said hot air source is further defined as being a jet engine.

3. The structure of claim **2** wherein said jet engine is operatively coupled to drive wheels for moving said machine and to said conveyer for moving said material from said scoop to an outlet openings.

4. The structure of claim **1** wherein said hot air source provides hot air at a temperature of at least 600° F.

5. The structure of claim **1** wherein said hot air source provides air moving at a speed of 500–700 m.p.h.

6. The structure of claim **1** wherein said hot air sources provides air at a temperature of at least 600° F. and moving at a speed of 500–700 m.p.h.

7. The structure of claim **1** wherein said hot air source is directed first through said conveyer at the forward end thereof.

8. The structure of claim **7** wherein said conveyer is endless and includes a series of longitudinally spaced apart flights whereby said air flow passageways are between said flights.

9. The structure of claim **8** wherein hot air in introduced into the side of said conveyer in a forward compartment and a series of compartment walls are provided between upper and lower conveyer flighting at distances equal to the longitudinal measurement of said flow passageways along said conveyer.

10. The structure of claim **1** wherein said frame includes support wheels at the front and rear ends, a pair of frame portions extend from the front and the rear end of said machine and are pivotally interconnected, said material conveyer is carried on said rear frame portion and a power cylinder is connected between said frame portions to raise and lower said scoop and conveyer.

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