United States Patent

[11] 3,604,324

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[54] **CURING BLANKET AND MACHINE**
5 Claims, 5 Drawing Figs.

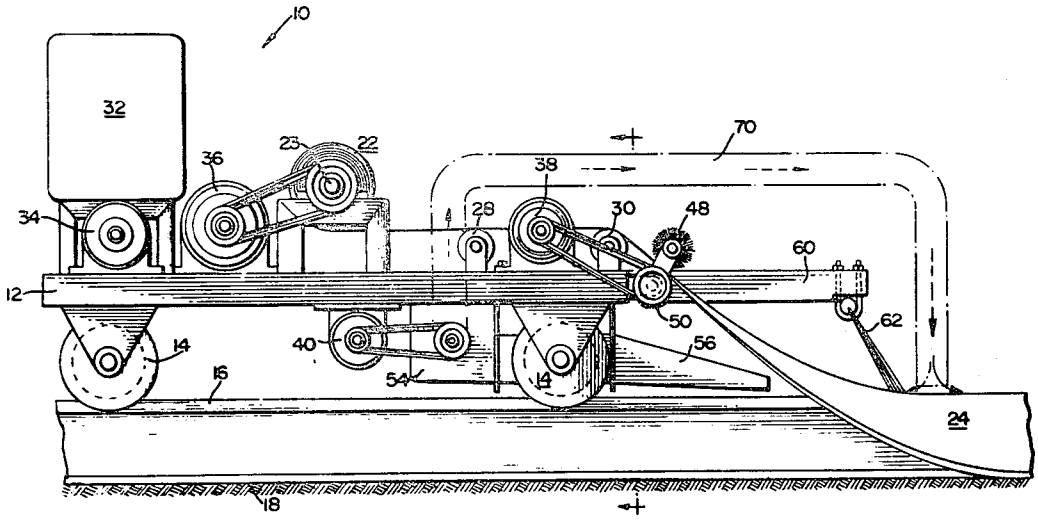
[52] **U.S. Cl.** 94/39, 25/1, 264/101, 273/27
[51] **Int. Cl.** E01c 23/03
[50] **Field of Search** ..... 25/1 F; 264/79, 101; 94/39, 22; 61/1; 135/5; 273/27

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ABSTRACT: A flexible concrete curing blanket of indefinite length is provided with tubes along its sides. The tubes are filled with water to weight and thus hold the blanket down. A self-propelled machine lays the blanket down on top of freshly poured concrete, the machine takes the blanket up when the concrete has cured.



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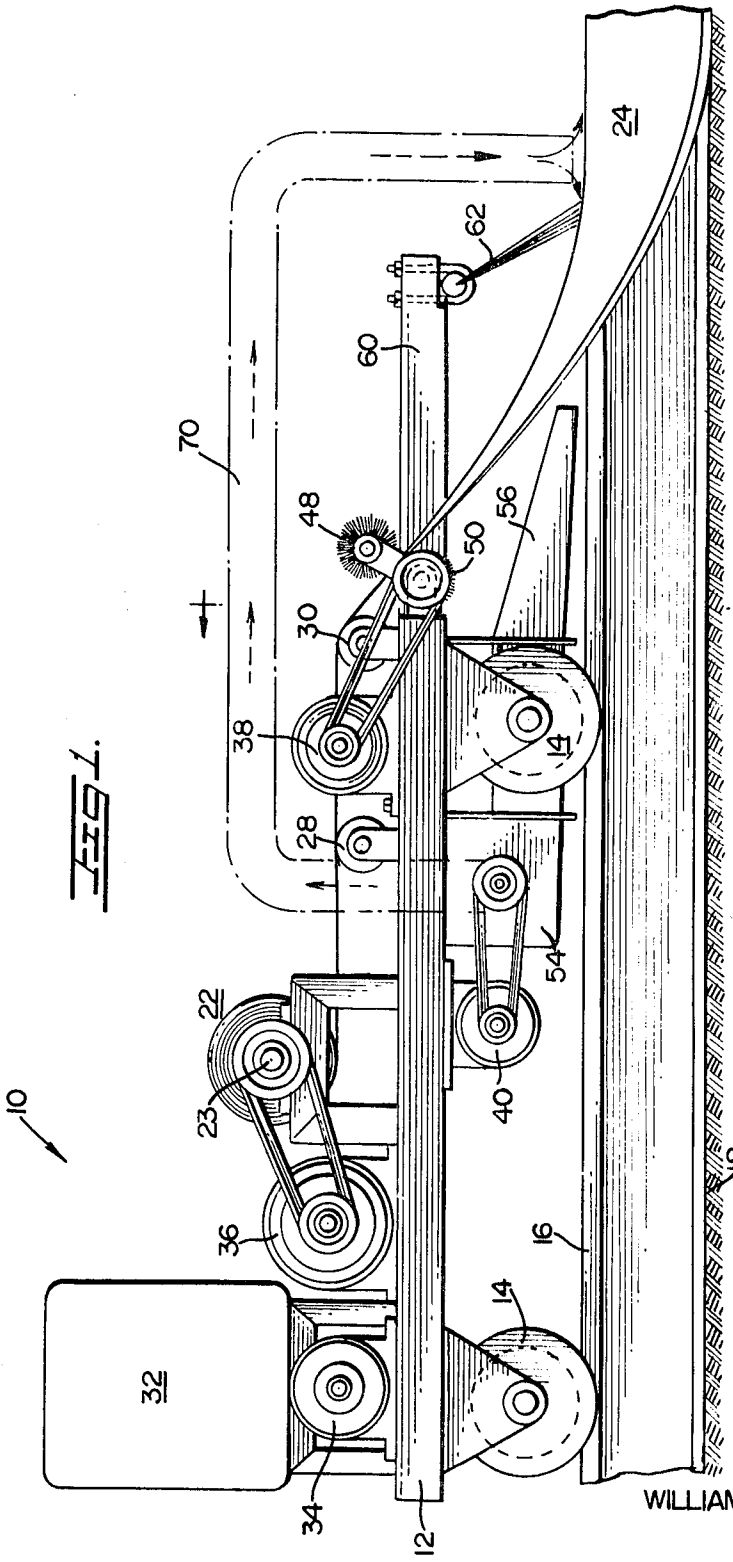


FIG. 1.

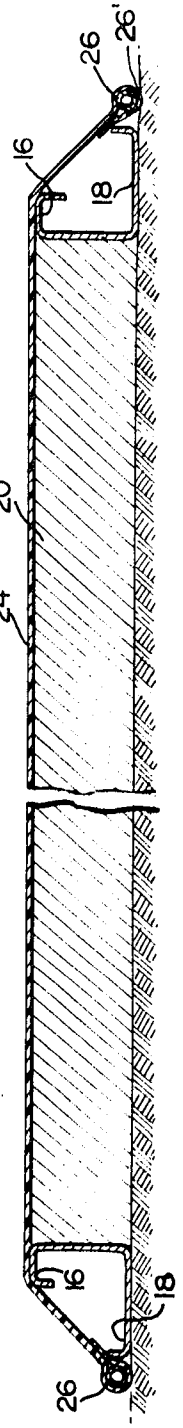


FIG. 2.

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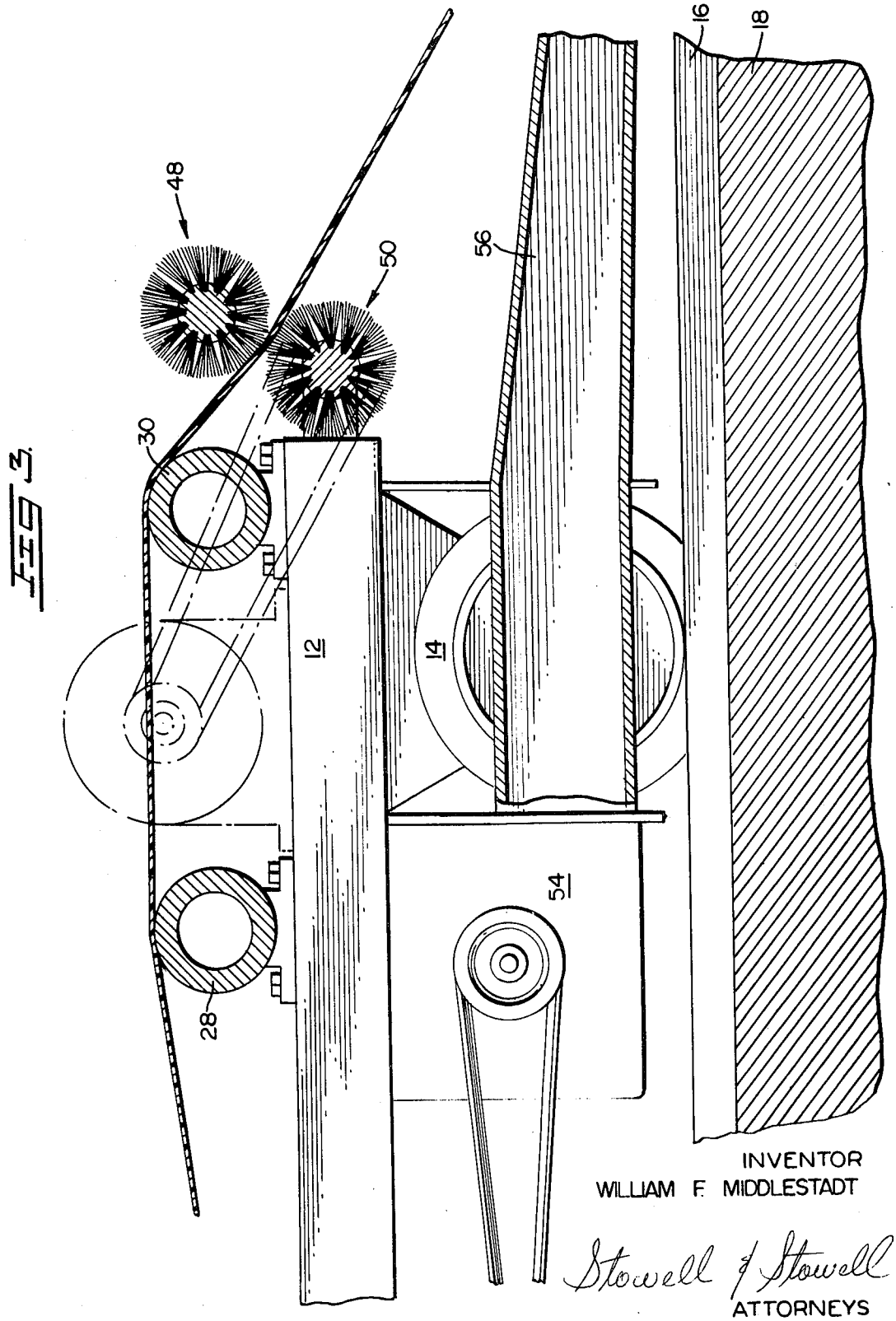


FIG. 2.

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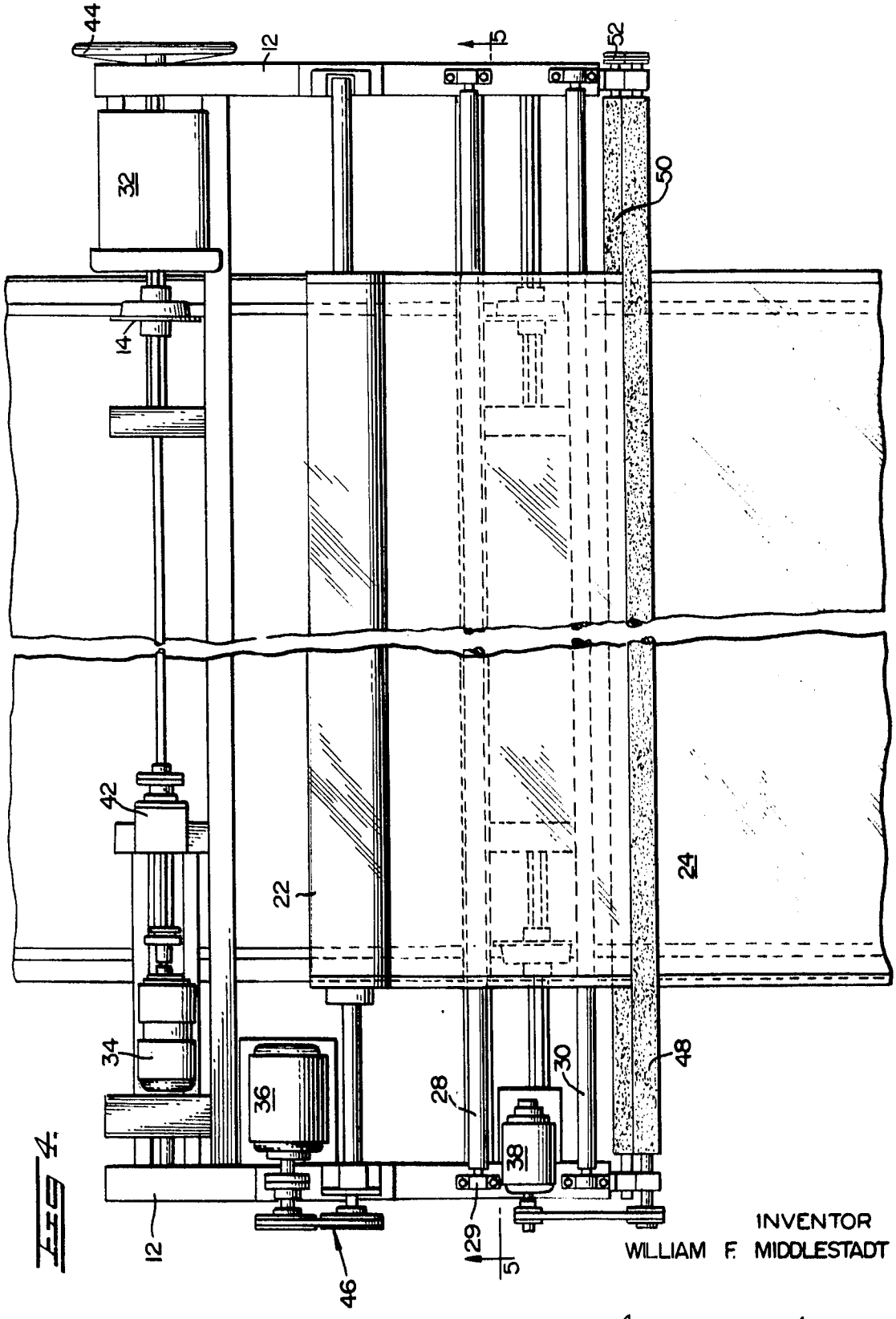
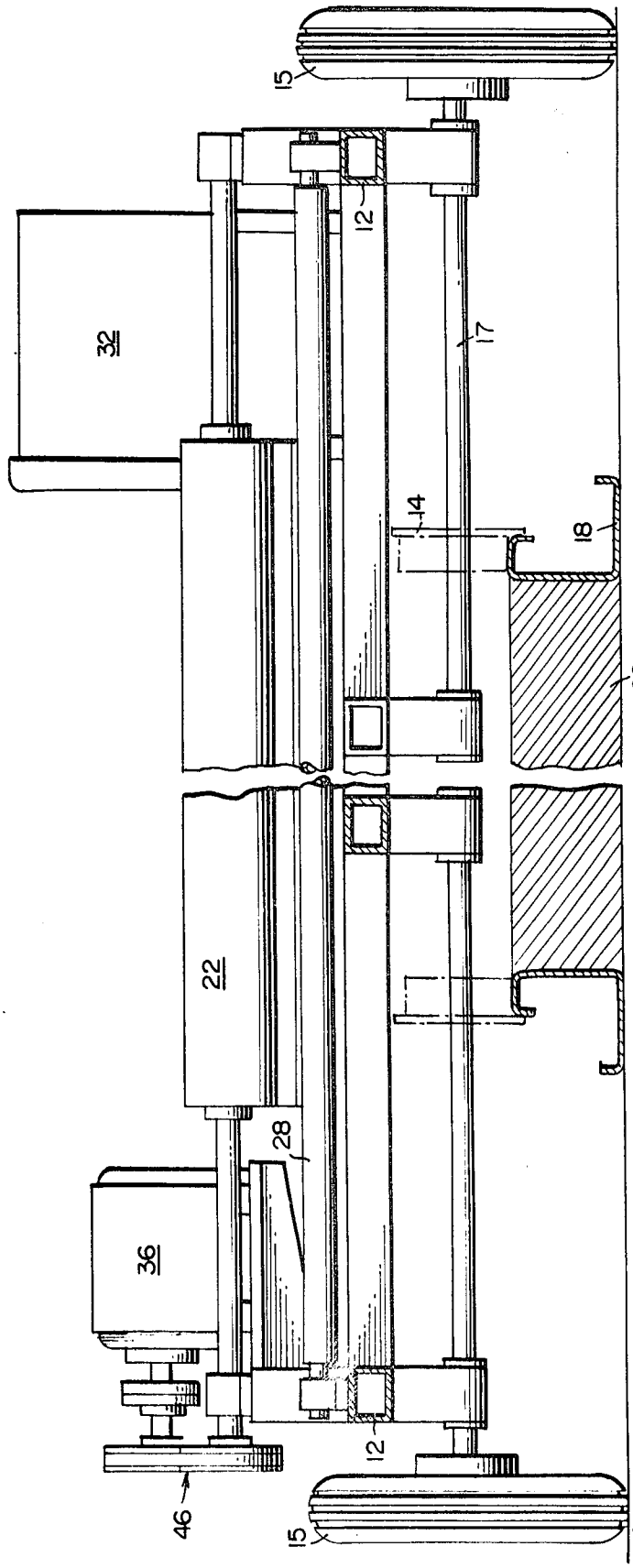


FIG 4.

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FIG. 5



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CURING BLANKET AND MACHINE

This invention relates to an imperforate holddown cover especially useful for curing concrete and more particularly to an elongated plastic cover having means disposed along its side edges for weighting the cover to thereby retain it in position over a mass of concrete which is curing.

The invention also relates to a machine for laying a holddown cover of indefinite length along, for example, a concrete strip which is being cured and which will serve as a road or roadbed. By virtue of certain characteristics of its construction, the machine may also be employed for removing the cover.

It is known in the construction arts to cover concrete which is curing and which is exposed to the atmosphere. The purpose of such covering is to prevent too rapid a loss of moisture. In this art it is often the practice to cover concrete while it is curing with cloth or other sheet material and retain the covering in place by bricks or other heavy objects placed on the concrete itself. Frequently, gusts of wind will lift or displace at least portions of the cover, thus permitting the concrete at such exposed portions to lose moisture at too rapid a rate.

According to the present invention, the above and other defects are overcome by the provision of a plastic cover of generally indefinite length provided with a hem at its side or longitudinal edges. Each hem defines a tube or closed elongated chamber which is adapted to be filled with water, although in practice a separate tube is inserted into the elongated volume to define the chamber. The ends of the chamber are then suitably clamped closed to maintain the water in place within the tube. The elongated plastic cover is thus weighted at each side edge and, being of appropriate width, hangs down over the side of the concrete mass being cured so as to thereby retain the moisture in the concrete as desired. After use, the water in each tube is released, thereby enabling the plastic sheets to be reused.

According to the further practice of the invention, concrete masses of indefinite length may easily be protected by a plastic cover by virtue of a certain laying and smoothing machine, the machine further functioning to take up the plastic cover at the conclusion of the curing time. In the drawings:

FIG. 1 is a slide elevational view, partially schematic, illustrating the machine of this invention used for laying a plastic cover;

FIG. 2 is a cross-sectional view of a concrete mass, such as commonly used to form a road, while it is being cured and protected from excessive loss of moisture by the plastic cover of invention;

FIG. 3 is a detail view, in partial cross section showing certain details of construction of the machine of FIG. 1; and

FIG. 4 is a top plan view of the machine of FIG. 1.

FIG. 5 is a view taken along line 5—5 of FIG. 4, and showing an alternative form of wheel support.

Referring now to the drawings, the numeral **10** denotes generally a self-propelled machine which lays an imperforate membrane along and on top of concrete masses of indefinite length. The numeral **12** denotes generally a rectangular frame upon which various members or elements which are to be described are mounted. The numeral **14** denotes wheels, similar to freight car wheels, upon which the device is movably supported. The numeral **16** denotes the top flange, similar in configuration to that of a common rail, of a rail element **18**. As illustrated at FIG. 2 of the drawings, the base portion of the rails rests on the ground. The rails **18** support a concrete pouring machine as it travels (all as well known in the art) and deposits a layer **20** of concrete.

The numeral **22** denotes a supply roll of plastic which pays out to form a strip **24** of imperforate plastic of indefinite length. Each longitudinal edge of the plastic strip is provided with a hem, the hem in turn defining a hollow seam **26**. In practice, the seam **26** may be formed by folding back upon itself a portion of the plastic web or sheeting. A tube **26'**, preferably of plastic or the like, is inserted into the seam. Each tube **26'** is adapted to be filled with water, generally available at construction sites, in order to weigh down the plastic sheeting, all as readily visualized by reference to FIG. 2 of the drawings. The width of the web is such that the filled tubes **26'** rest on the ground.

The numerals **28** and **30** denote elongated rollers, mounted at their ends in bearings, and upon which the web **24** rests while being unwound from the supply spool **22**. The numeral **32** denotes an electrical generator whose power output supplies electrical energy to motors **34**, **36**, **38** and **40**. Motor **34** is coupled through a clutch mechanism denoted generally by the numeral **42** to a chain drive (not illustrated) for driving one of the axles upon which the wheels **14** are mounted. A hand brake is actuated by a wheel **44** to maintain the device positioned while various adjustments and installations are taking place. The supply spool **22** is unwound at a predetermined rate by motor **36** acting through coupling belt and pulley arrangement **46**. In general, motor **36** may be internally provided with suitable gear reduction mechanism so that its output will slowly turn the supply spool counterclockwise as the device moves from right to left. It will be understood that motor **36** is reversible, for reasons which will presently appear, as when the machine is run from left to right. The plastic sheeting **24** passes between two elongated and rotary brush members **48** and **50**, rotatable generally in opposite directions, and driven by motor **38**. The rotary brushes are coupled together by means of a belt indicated by the number **52**.

Referring now specifically to FIGS. 1 and 3 of the drawings, the numeral **54** denotes a housing for dual pumps or any other mechanism for reversing the flow direction of air. When energized in one manner, mechanism **54** operates so that air is exuded from the nozzle **56** and in another manner the flow direction is reversed and the snout **56** acts as a suction device. It will be observed, particularly with respect to FIG. 1 of the drawings, that the tip of the snout **56** is contiguous to the surface of the concrete mass **20** and also to the sheet **24**, i.e., to their nip.

The numeral **60** denotes generally a forwardly extending bracket, adapted to be secured on an edge portion of the movable frame **12**. The bracket is adapted to carry a downwardly extending brush **62** whose lower portion is adapted to lightly contact the top of the plastic film **24** when the latter lies on top of the concrete mass **20**.

In operation of the machine, the generator **32** feeds the various motors which have previously been described. Motor **34** is energized and through clutch element **42** the chain drive connected to the left axle of FIG. 1 rotates the left wheels **14**. The direction of rotation in this case is from right to left in FIG. 1. It will be understood that prior to the beginning of travel of the machine **10**, the supply spool **22** has been placed on the device, with a portion of the plastic web **24** laid upon the rollers **28** and **30**, passed between the brushes **48** and **50**, and laid upon a portion of the concrete mass which is to be cured. The free ends of the tubes **26'** are continually filled with water as the length of the film **24** laid on the concrete **20** continually increases. The motor **36** slowly turns the supply spool **22** paying out the plastic strip as the device moves from right to left. The motor **38** turns the rotary brush **48** which also rotates rotary brush **50**. In this manner, any particulate material which may settle on top of the plastic film or which may have already been on the plastic film before its unwinding is cleaned off. The mechanism **54** is in operation causing a suction at the tip of snout **56** to draw air away from the wedge shaped volume immediately above the concrete mass **20** and immediately below the plastic sheet **24**. This causes atmospheric pressure to urge the sheet in surface contact with the top of the concrete mass. In order to assist this smoothing action, the brush **62** also acts to push down the plastic strip. The above-described action takes place as long as the supply spool **22** plays out the spool **24**, or until the end of the concrete mass **20** is reached. At this time, the supply spool **22** is taken off the device and placed over the edge of the concrete **20**, the water in the tubes **26'** acting as above described to effectively secure and hold down the assembly.

When it is desired to remove the plastic cover after the curing process has taken place, the supply spool **22** is placed upon the shaft **23** of the machine, the plugs at the remote ends of the plastic tube **26'** are removed to thereby allow the water therein to flow out. Now the motor **34** is operated in the reverse direction to thereby cause the self-propelled machine to proceed from left to right. The motor **36** also rotates in an opposite direction, here causing the supply spool **22** to rotate in a clockwise direction. The front bracket **60** with the associated brush **62** is not employed for this operation and is hence generally removed. The rotating brushes **48** and **50** again function to remove any particulate material which may have settled on the top of the plastic sheet **24**, as well as to remove any particles of concrete which may adhere to the bottom or lower portion of the sheet. The blower mechanism **54** is operated in an opposite manner, here causing air to blow from the tip of snout **56** to assist in raising up sheet **24** from the top of the now cured concrete.

It will be understood that the elongated rollers such as **28**, **30**, **48** and **50** are journaled in bearing elements such as shown at **29** in FIG. **4**. The various electrical switches and controls for the generator have not been illustrated as they are not significant for the practice of this invention.

An embodiment is illustrated by the dashed lines of FIG. **1**. There, the numeral **70** represents a curved duct, coupled to the blower **54**. When laying the imperforate web, the blower forces air out of the right end of the duct **70**, down onto the web to thereby assist in smoothing it. This modification may be employed in addition to or in lieu of the brush **62** and the vacuum of nozzle **56**.

It will be noted that the various drives required are supplied by separate motors, this allowing the various components such as the blower and the rotating brushes to function independently of the motion of the machine. For example, the brush rotation may be varied for particular dirt conditions and for various web thicknesses as well as other web materials. Further, the rotary brush force against each other may be varied for optimum squeezing out of water in the side tubes when the machine operates to take up the web.

The showing of FIG. **5** of the drawings illustrates the use of conventional pneumatic wheels **15** mounted on axle members **17**. The axles may be the same or different from those carrying rail wheels **14**. The employment of the tires **15** may be dictated by such factors as the flexure strength of rails **18** and their upper bearing configuration, as well as the weight of the entire device **10**.

What is claimed is:

1. A machine for laying down and taking up flexible webs of indefinite length, said machine including,

a. a frame having wheel means,

b. said frame having means to rotate and support a web supply spool,

c. a nozzle and air energizing means therefor carried by the frame for directing air adjacent a web,

d. means carried by the frame for moving the frame along a path,

e. said nozzle having its air blowing direction parallel to a plane defined by lower surfaces of the said wheel means,

f. said nozzle having its air blowing direction the same as the intended direction of frame travel as defined by said wheel means.

2. The machine of claim **1** including,

a. an exhaust conduit having one end coupled to the said nozzle energizing means and having its other end positioned to discharge air generally downwardly, such downward discharge adapted to smooth down a web being laid by the machine.

3. The machine of claim **1** including

a. means carried by said frame for brushing a web fed from a supply spool over the web surfaces, said means defined by at least one rotary brush adapted to tangentially contact a web.

4. A method of removing a generally imperforate web of indefinite length from the top surface of a hardened concrete slab, including the steps of,

a. continuously pulling a web upwardly from the top surface of a concrete slab along the length of the slab,

b. continuously blowing air at the line of separation (or contact) between web and concrete surface, as the web is being pulled.

5. A method of laying a generally imperforate web of indefinite length on the top surface of an uncured concrete slab including the steps of,

a. continuously laying down a web on the top surface of the concrete slab along the length of the slab,

b. continuously removing air from the line of separation (or contact) between web and concrete surface, as the web is being laid down.