Dec. 14, 1965 R. A. ROSS ETAL 3,223,329

FLOCKING APPARATUS

Filed Jan. 16, 1962 3 Sheets-Sheet 1

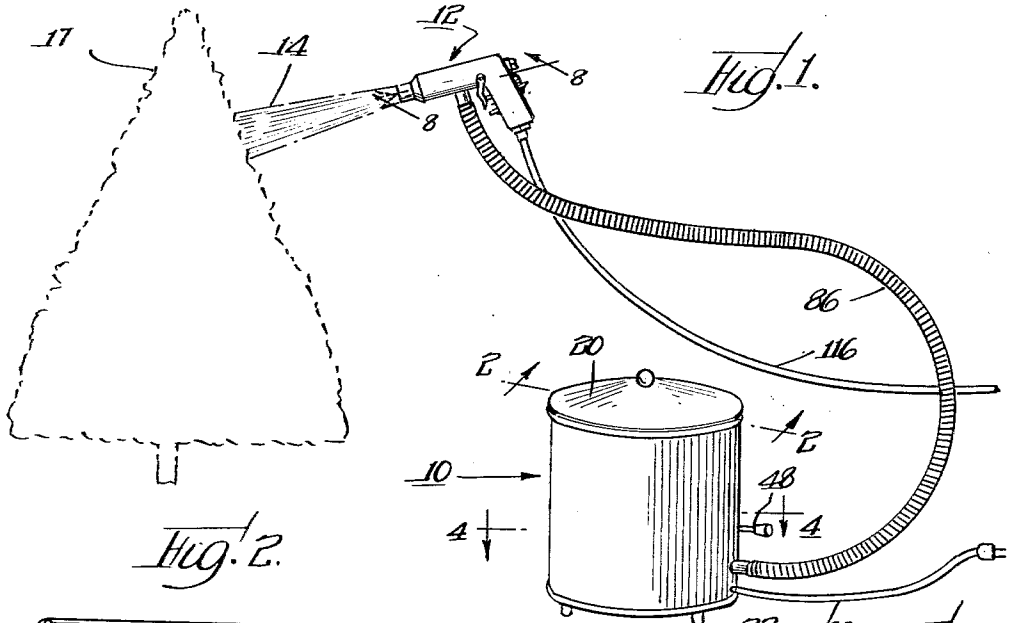


Fig. 1.

Fig. 2.

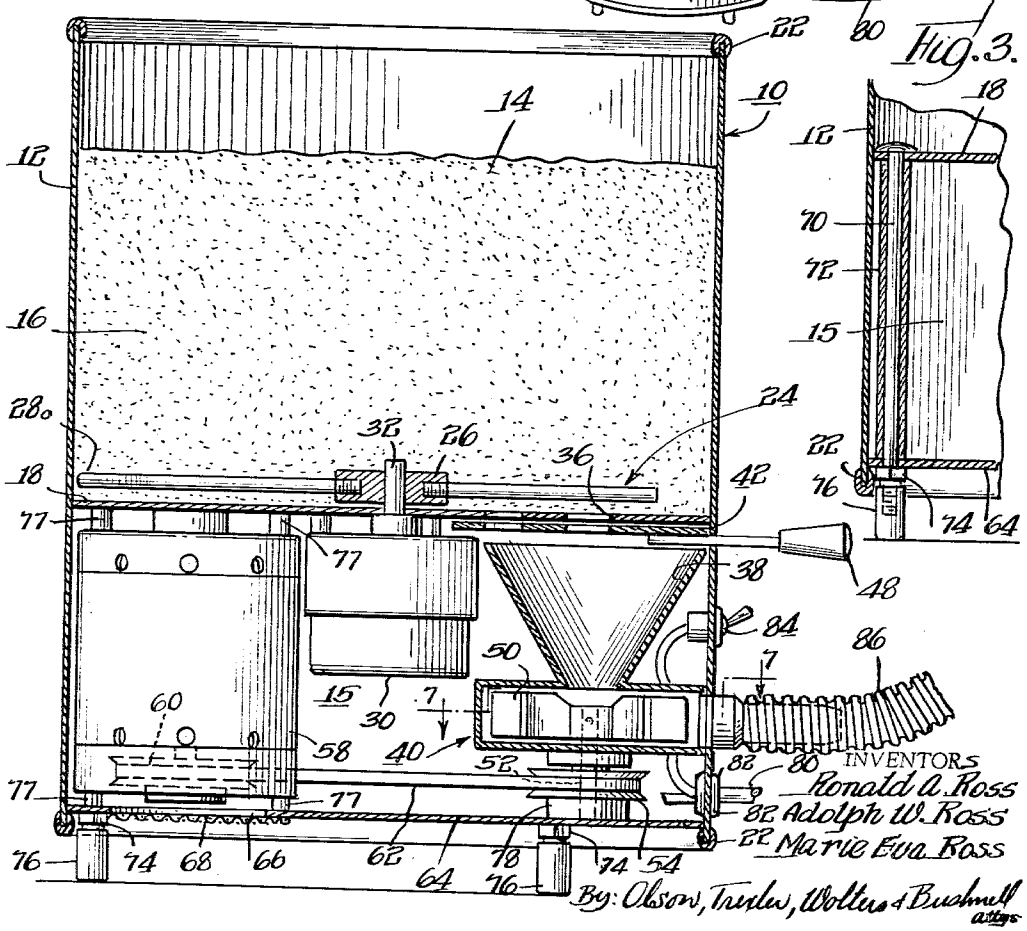


Fig. 3.

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FLOCKING APPARATUS

Filed Jan. 16, 1962 3 Sheets-Sheet 2

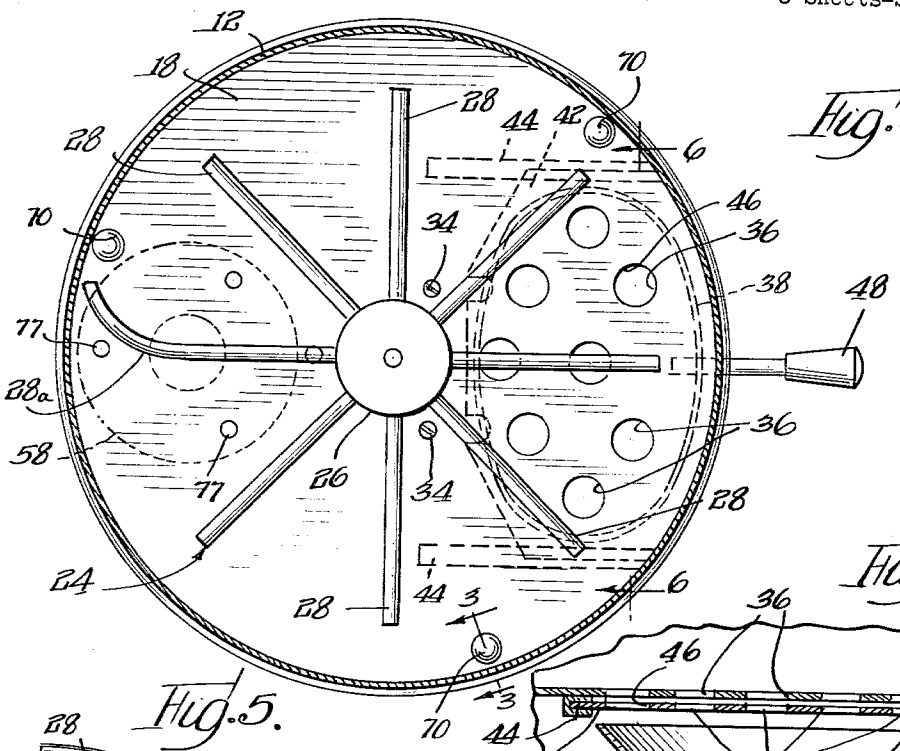


Fig. 4.

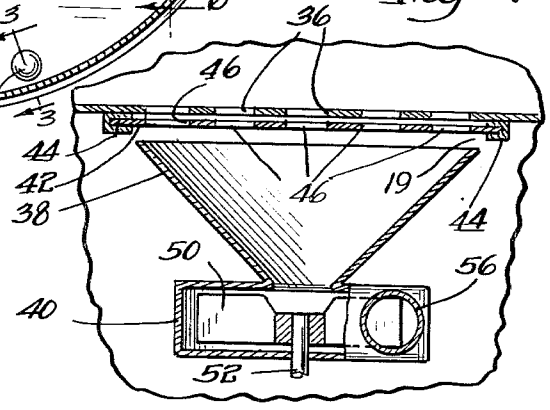


Fig. 6.

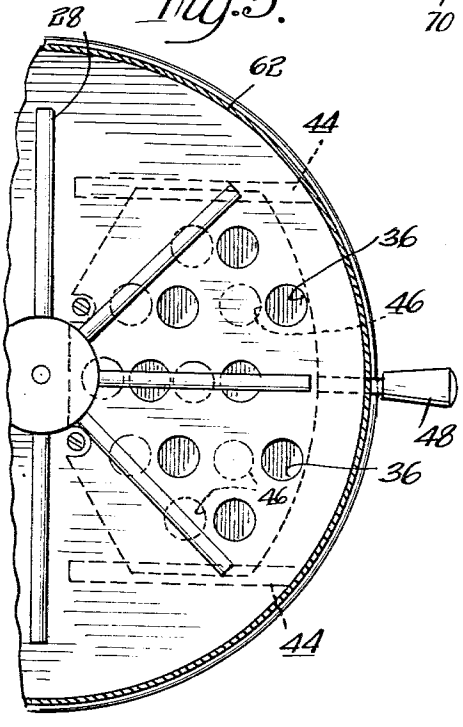


Fig. 5.

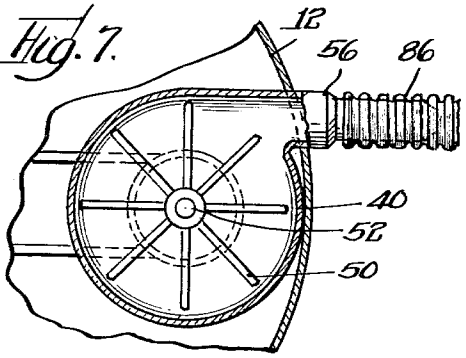


Fig. 7.

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FLOCKING APPARATUS

Filed Jan. 16, 1962 3 Sheets-Sheet 3

Fig. 8.

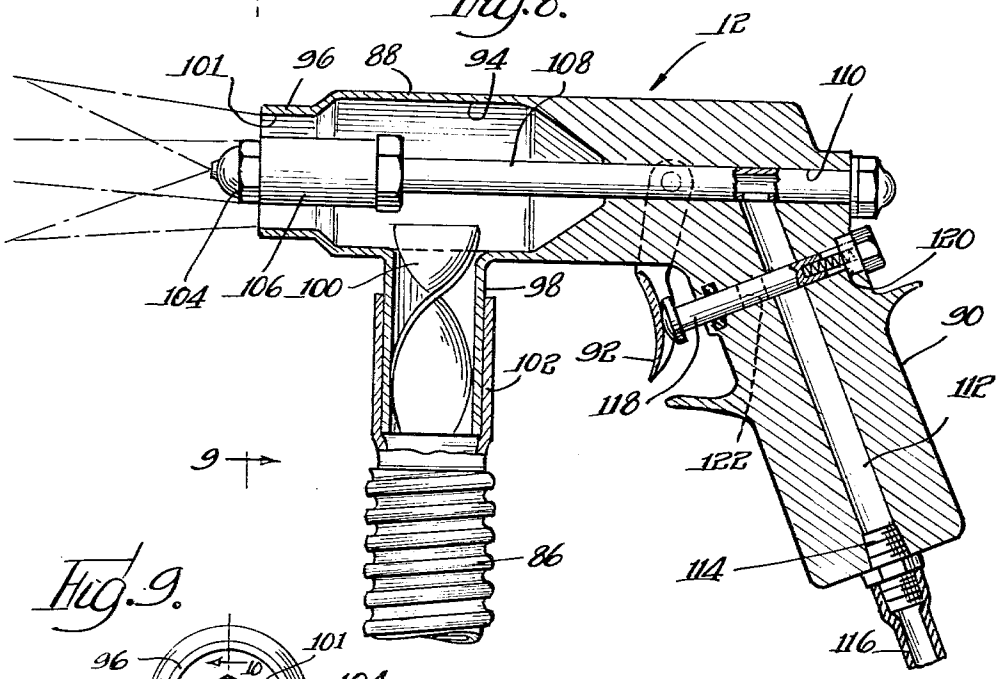


Fig. 9.

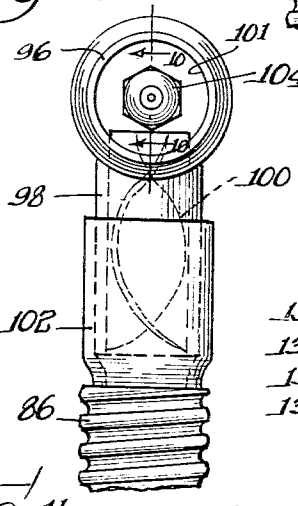


Fig. 10.

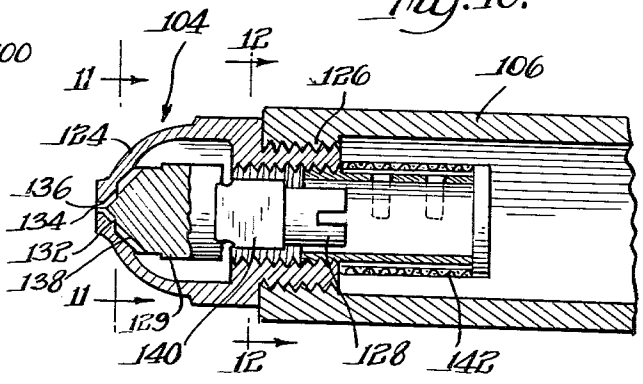
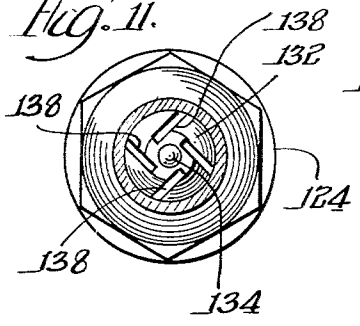


Fig. 11.



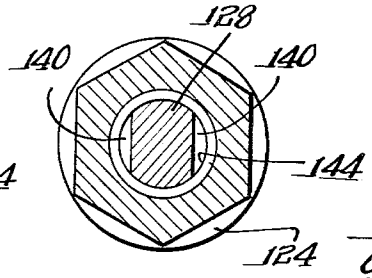


Fig. 12.

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United States Patent Office 3,223,329 Patented Dec. 14, 1965

3,223,329

FLOCKING APPARATUS

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Filed Jan. 16, 1962, Ser. No. 166,480
10 Claims. (Cl. 239—142)

The present invention relates to the spray coating of sticky granular materials, and is more particularly concerned with an improved method and apparatus for applying flock and the like materials.

An important object of this invention is to provide a compact apparatus for applying granular materials such as flock having an activatable adhesive interspersed therein, the apparatus being adapted to expel the material from an applicator in an adherable condition to coat articles for decorative or protective purposes.

Another object of the present invention is to provide an improved method for coating objects with flock, which method is characterized by passing a turbulent, swirling stream of flock through a mist of an adhesive-activating agent to react with an adhesive suspended in the stream thereby to transform the flock into an adherable condition.

Still another object is to provide a method of the type described in the foregoing object which may be readily and satisfactorily practiced by operators having slight skill and training.

Yet another object is to provide an improved method for coating objects with flock whereby the flock is applied in a thoroughly sticky state and which method materially reduces the quantity of dust generated dispersed into the surrounding atmosphere.

Still another object of the present invention is to provide a compact canister unit for holding a supply of flock whereby an activatable adhesive interspersed in the flock is maintained in substantially intermixed condition.

Yet another object is to provide an improved canister of the type described having a hopper for flock and a substantially enclosed mechanism compartment through which a stream of cooling air is directed about a motor mechanism therein prior to entering the flock propelling means.

Still another object is to provide an improved flock applying apparatus for configurating a stream of air-suspended dry flock carrying an activatable adhesive in a swirling path having an annular cross section and to direct a mist of an adhesive-activating material into said path.

Yet another object is to provide an apparatus as described in the latter object wherein the stream of dry flock is received into an expansion chamber and expelled therefrom into a conically directed mist of atomized particles of an adhesive-activating material.

A further object of the present invention is to provide an improved method and apparatus which is economical and simple to use for rapidly and efficiently coating objects for decorative and other purposes.

Further features of the invention pertain to the particular steps of the method and arrangement of the elements of the apparatus whereby the above-outlined and additional operating features are attained.

The present invention, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification taken in connection with the accompanying drawings wherein like reference numerals designate like parts throughout, in which:

FIGURE 1 is a perspective view of an apparatus constituted in accordance with the principles of the present invention and including a canister having a cover and a flock applicator gun, the gun being shown in a condition for directing a stream of sticky flock into contact with an evergreen tree;

FIG. 2 is an enlarged, vertical sectional view of the canister shown in FIG. 1 and having the cover removed therefrom, the section being taken along the line 2—2 therein;

FIG. 3 is an enlarged, fragmentary, vertical sectional view taken in the direction of the arrows along the line 3—3 in FIG. 4;

FIG. 4 is an enlarged, horizontal sectional view taken in the direction of the arrows along the line 4—4 in FIG. 1;

FIG. 5 is a fragmentary view of a flock metering apparatus shown in FIG. 4, the metering apparatus being shown in a closed position;

FIG. 6 is a fragmentary vertical sectional view taken in the direction of the arrows along the line 6—6 in FIG. 4;

FIG. 7 is a fragmentary, horizontal sectional view taken in the direction of the arrows along the line 7—7 in FIG. 2;

FIG. 8 is an enlarged, fragmentary, longitudinal sectional view taken in the direction of the arrows along the line 8—8 in FIG. 1;

FIG. 9 is a view taken generally in the direction of the arrows along the line 9—9 in FIG. 8;

FIG. 10 is a greatly enlarged, fragmentary, longitudinal sectional view taken in the direction of the arrows along the line 10—10 in FIG. 9;

FIG. 11 is a transverse sectional view, on the scale of FIG. 10, taken in the direction of the arrows therein along the line 11—11; and

FIG. 12 is a view similar to FIG. 11 but taken in the direction of the arrows along the line 12—12 in FIG. 10.

In FIGURE 1 of the drawings there is shown a flocking apparatus made in accordance with and embodying the principles of the present invention, and including a canister, designated generally 10, in operative association with a flocking gun, designated generally 12, which is depicted as applying a stream of flock 14 to a conifer or evergreen tree 17. The flock 14 is commonly applied to objects such as the conifer 17 for purposes of decoration, the flock 14 also affording a degree of fireproofing when a fire-resistant agent is incorporated in the body of the flock material. Although the varieties of its constituents are numerous, flock, in the dry state, is generally granular in quality and is a mixture of finely cut fibers of rayon, cotton, or wool having a powdered adhesive, usually of a starch or wheat flour base, comprising approximately 33⅓ of the bulk. As is known, such an adhesive is activatable when brought into contact with moisture, thereby to produce a sticky substance. Further, the flock composition may include mica or small particles of bright metallic elements to afford a sparkling quality to the object therewith.

The canister or housing 10 comprises a metal, cylindrical casing 12 divided into a compact mechanism compartment 15 and an upper compartment or hopper 16 by a circular diaphragm plate or hopper bottom 18 suitably secured, as by welding, to the casing 12. The portion of the casing 12, which extends above the hopper bottom 18, is circular and forms a circular wall of the hopper 16. The upper end of the hopper 16 is open for purposes of supplying therein a quantity of the dry flock 14 having an interspersed powdered dry adhesive. A cover 20 (shown in FIG. 1) may be fitted over the open end of the hopper 16 to afford a degree of protection to the flock 14 stored therein. The upper edge of the casing 12 is encased in a smoothly shaped ring of material 22 which covers the

sharp edges and prevents cutting of the hands during handling of the canister **10**, clearly shown in FIG. 2.

Referring particularly now to FIGS. 2, 4 and 5, a multi-armed agitator **24** is operatively mounted over the diaphragm plate **18** in the hopper **16**. The agitator **24** includes a central hub **26** having eight elongated arms **28** radiating outwardly therefrom in an equally spaced apart relationship. As will be seen clearly in FIG. 4, the free ends of seven of the arms **28** terminate a short distance away from the inner surface of the casing **12**. An arm **28***a*, on the other hand, includes a curved end portion disposed in a close relationship with the inner surface of the casing **12** thereby to sweep any flock which tends to adhere to the walls.

It has been found that where an agitator such as the device **24** is not provided, the adhesive interspersed in the flock **14** tends to stratify and settle out and the flock tends to "cake" or "bridge" onto the walls of the casing **12**. The operation of the agitator **24** materially reduces the tendency of the flock to stratify and cake within the hopper **16**.

A slow speed gear motor **30**, shown best in FIG. 2, is arranged in the mechanism compartment **14** thereby to present a vertical shaft **32** extending through an aperture in the diaphragm plate **18** to engage the hub **26** of the agitator **24**. The housing of the gear motor **30** is secured to the diaphragm plate **18** by a plurality of fasteners **34**, shown best in FIG. 4. The motor **30** being connected to an electric power switching source, to be described hereinafter, revolves the agitator **24** at approximately 8 r.p.m. It has been found that when the hopper **16** contains a quantity of from 3 to 25 pounds of dried flock a $\frac{1}{30}$th horsepower gear motor **30** is satisfactory to rotate the agitator **24** sufficiently to prevent adhering of the flock to the hopper walls.

A group of circular openings **36** are disposed in the diaphragm plate **18** to pass flock therethrough by gravity into a funnel-shaped intake **38** of a high speed blower **40**. As shown best in FIG. 6, the upper end of the funnel-shaped intake **38** extends into proximate underlying relation to the hopper bottom **18** but is spaced somewhat from the hopper bottom to define between the hopper bottom and the upper end of the intake **38** an intake opening **19** through which the blower **40** sucks intake air from a region adjacent the flock outlet openings **36**. The outlet openings **36** define an outlet area in the hopper bottom **18** through which flock is discharged from the hopper down into the intake **38**. It will be noted with reference to FIG. 4 that the outlet openings **36** are located in a pattern extending over a discharge zone in the hopper bottom **18** that subtends to the axis of the hub **26** a radial angle equal to approximately twice the angular spacing between adjacent agitator arms **28** extending from the hub. This arrangement assures that upon rotation of the arms **28** the discharge zone of the hopper bottom **18** defining the outlet openings **36** is continuously swept by two overlying arms **28**, each movement of an arm **28** out of overlying relation to the discharge zone being synchronized automatically with movement of another arm into overlying relation to the discharge zone. The result is to produce continuous feeding of flock at a constant rate out through the outlet openings **38** into the underlying air and flock intake **38** into the blower **40**. To afford a metering of the flock into the intake **38** a reciprocable shutter **42** is operatively mounted on the plate **18** beneath the group of openings **36**. More specifically, a spaced pair of channel elements **44**, shown in FIGS 4–6, receive the edges of the flat shutter **42** to provide a smooth action as the shutter **42** is moved in a horizontal plane. A plurality of spaced openings **46** are arranged in the shutter plate **42** whereby the openings **46** are in register with the openings **36** in the position of the shutter as shown in FIG. 4. Conversely, when the shutter plate **42** is urged forward as by pushing an outwardly extending handle **48**, the openings **36** are closed by the shutter plate **42**, clearly shown in FIG. 5.

The inlet **38** of the blower **40**, being disposed immediately beneath the openings **36**, **46**, channels the flock into the turbine casing or scroll and into the eye of a high speed, rotatable impeller or rotor **50**. The multiblade impeller **50** rotates in response to power applied to a vertical axle **52** having a pulley **54** securely mounted thereon. As shown in FIG. 7, the impeller **50** includes an offset outlet **56** which projects tangentially from the blower casing and extends through an opening in the casing **12**, thereby to present a connection means for receiving a conduit thereover.

Power is supplied to the pulley **54** of the rotor **50** from a high speed electric motor **58** arranged in the mechanism compartment **15**. The motor **58** is provided with an internally arranged pulley **60**, and a slot (not shown) is arranged in the motor casing to receive therethrough a power transfer belt **62** entwined over the pulleys **60** and **54**. The motor **58** is constituted and constructed to operate at a speed of 15,000 r.p.m. when delivering a power of approximately $\frac{1}{10}$th horsepower. By suitable sizing of pulleys **54** and **60**, the speed of the turbine impeller **50** may be varied from 7,500 to 30,000 r.p.m., thereby to propel the flock **14** through the blower **40** at a rapid velocity.

The blower **40** and the motor **58** are each fixedly mounted upon a floor plate **64** defining the bottom closure of the motor compartment **15**. The plate **64** is continuous having only a single sizable aperture **66** therein arranged coaxially with the motor **58**. It will be noted here that the large end of the funnel intake **38** is spaced from the shutter **42** and plate **18** whereby as air is supplied to the rotor **50** a draft is effected through the air intake opening **66**, through the high speed motor **58**, and across the gear motor **30** into the blower **40**. A screen **68** is secured over the opening **66** to act as a filtering medium precluding the entry of foreign objects into the operating mechanism disposed within the compartment **15**.

The floor plate **64** is mounted in the casing **12** by means of three long rods **70** and tubular spacer element **72**, shown best in FIGS. 3 and 4. The rounded upper ends of the rods **70** are rigidly secured to the diaphragm plate **18**, as by brazing or welding, and extend downwardly beyond the end of the casing **12**. The spacer tubes **72** are received over the rod **70** to space the floor plate **64** a predetermined distance from the metal diaphragm **18**. A nut **74** threadably received on the lower end of each rod **70** maintains the plate **64** securely with respect to the casing **12**. The free end of the rod **70**, extending beyond the nut **74**, receives a protective cap portion **76** thereover thereby providing legs for the canister **10**.

The high speed motor **58**, being mounted with its rotating axis in a vertical plane, presents mounting bolts **77**, at each end respectively, extending through complementary holes in the diaphragm plate **18** and the floor plate **64**. The mounting bolts **77** are fixedly secured to the plates **18**, **54**, to afford a rigid, vibration-free, motor mounting structure.

The blower **40** is fixedly mounted on the floor plate **64** having a thrust receiving, bearing block **78** operatively mounted on the plate **64** for receiving the vertically arranged impeller shaft **52**.

The lower edge of the casing **12** is covered with a protective element **22** similar to that received over the top edge of the casing **12**.

An electrical conduit **80** is received through a grommet **82** in the casing wall and extends into the mechanism compartment **15**. The electrical conduit **80** being connected to a toggle switch **84** provided on the wall of the casing selectively supplies electric power to both the gear motor **30** and the high speed motor **58**.

The flock particles **14** received in the inlet **38** of the blower **40** issue at high velocity suspended in an air

stream from the blower outlet **54** and are conveyed through a flexible conduit **86** into the flocking gun **12**. Referring now to FIG. 8, the flocking gun **12** includes a hollow barrel portion **88** which projects outwardly from a handle **90** which is provided with a trigger mechanism **92** to be more fully described hereinafter.

The barrel **88** defines an expansion cavity **94** which is substantially curvilinear in cross section having an axial length substantially greater than its diameter. The end of the barrel **88** terminates in an open neck portion **96** of a lesser diameter than that of the expansion cavity **94**.

A cylindrical inlet **98**, generally tubular in form, opens into the cavity **94** at about the midportion thereof. A helically arranged baffle **100** is interposed in the inlet **98** and protrudes a short distance into the expansion chamber **94**. An end of the flexible conduit **86** is provided with a collar **102** adapted to be slidably received over the inlet **98**. It is to be appreciated that as the stream of flock is emitted from the blower outlet **56** and propelled along the flexible tubing **86** to be passed over the helical baffle **40** a twisting or swirling action is imparted to the stream. It has been found that absent such a baffle **100** which may be disposed as well in the chamber **94** albeit in a modified form, the stream issues from the orifice **101** of the gun **12** in an irregular pattern, the flock flowing unevenly and principally from the upper segment of the orifice **101**.

A nozzle **104** is centrally mounted in the orifice **101** of the barrel **88** thereby to define with the neck **96** the annular configuration of the orifice **101**. The nozzle **104** is constructed and arranged to discharge a finely divided, atomized, spray of adhesive-activating agent, preferably water, into the stream of swirling flock. It is to be noted that the nozzle **104** projects the spray in a generally conical pattern having an apex angle of substantially 45 degrees.

Being threadably mounted in a hollow coupling **106**, the nozzle **104** receives a supply of reagent through a conduit **108** threadably engaged in the opposite and inwardly disposed end of the coupling **106**. The conduit **108** is arranged coaxially of the cavity **94** and is supported rearwardly of the barrel **88** in the handle or body portion of the gun **12**. The conduit **108** may be a length of tubing fitted to the body of the gun **12** through a first bore **110** which is in communication with a second bore **112** centrally disposed in the handle **90**. The bore **112** terminates in a threaded nipple **114** connectable to a source of water under pressure through the flexible tubing or hose **116**. It has been found that water supplied from the municipal water mains at 30 to 35 p.s.i. suffices to produce a mist of water issuing from the nozzle **104** having the requisite wetting properties.

A valve structure comprising a plunger **118** biased by a coil spring **120** into engagement with the pivotally mounted trigger **92** is reciprocable to control the water flow in the conduit **112**. More specifically, an aperture **122** is passed into alignment with the conduit **112** when the trigger **92** is squeezed rearwardly toward the handle **90**. Thus it is seen that control of the water flow to the nozzle **104** may be effected by selective actuation of the trigger **92**.

Referring more particularly to the construction of the nozzle **104** and especially to FIGS. 10–12, it is seen that a hemispherical shaped hollow body **124** of the nozzle **104** presents a narrow collar **126** for threadable engagement with one end of the bushing **106**. A generally cylindrical plug element **128** is threadably received through the internally threaded surfaces of the collar **126** and projects a head or end **129** into the hollow portion of the body **124**. The head **129** of the plug **128** is generally frusto-conically shaped having a planar face **132** surrounding a small flat cone **134**. When the plug **128** is operatively assembled within the body **124** the cone **134** projects through an aperture **136** in the body **124**.

To maintain a passageway of predetermined dimension from the hollow portion of the body **124** through the aperture **136** thereof four grooves **138** are arranged tangentially in the frusto-conically shaped portion of the plug **128** about the point or cone **134** best shown in FIG. **11**. The threaded portion of the plug **124** is provided with a narrowed section defined by parallel flat surfaces **140** which are spaced inwardly from the internally threaded surface of the collar **126** in the assembled condition of the plug **128** and body **124**, best shown in FIG. 12. Thus it may be seen that water under pressure may pass through the coupling **106** and being filtered by a cylindrical wire gauze screen **142** passes through a pair of crescent shaped passageways **144** (FIG. 12) into the hollow portion of the nozzle **124** and through the grooves **138** and is discharged in a 45 degree cone through the aperture **136**. It will be appreciated with reference to FIGS. 10 and 11 in particular that the water flows through the grooves or channels **138** in a plurality of streams that intersect each other by virtue of the orientation of the channels or grooves **138**. The plurality of high speed streams of water thus directed into intersecting relation to each other effect a mutual atomization of all the water streams so that the water upon issuing from the aperture or outlet **136** is highly atomized to effect the desired moistening of the encircling stream of flock into which the atomized pattern of water diverges.

In the operation of the flocking apparatus **10** a supply of flock is first provided in the hopper **16** and the water conduit **116** is connected to a source of water under pressure, 30 to 35 p.s.i. being adequate. Upon connection of the electric cord **80** to an associated outlet (not shown) the toggle switch **84** may be actuated to set the gear motor **30** and the high speed motor **58** into operation, thereby to respectively activate the agitator **24** and the high speed blower **40**. The reciprocable shutter **42** is moved to select the proper area of opening from the hopper into the inlet **38** of the turbine **40** thereby to control the quantity of flock **14** applied to the article such as the conifer **17**. It is to be appreciated that as the blower **40** withdraws air from the compartment a draft through the aperture **66** adjacent the high speed motor **58** is induced thereby to cool the motor **58** and the gear motor **30**.

The flock **14** discharged in a steady stream through the turbine outlet **56** is conveyed through the flexible conduit **86** across the helical baffle **100** disposed in the inlet **98** of the flocking gun **12**. Thus, a swirling action is imparted to the stream of flock as it emerges from the conduit **86** into the expansion chamber **94**. Still retaining a high quantity of energy imparted to it by the turbine **40**, the stream of flock issues from the annular orifice of the gun **12**, shown best in FIG. 9, into the throat of the conically shaped spray concurrently issuing from the nozzle **104**. The spray of water being finely divided or atomized activates the powdered adhesive carried in the flock **14**, thereby rendering the flock in an adherable state.

When it is decided to discontinue the flock applying operation, the trigger **92** of the gun **12** is released to close off the water supply and the shutter **42** is urged inwardly by pushing the handle **48** toward the center of the casing **12** thereby to close the openings **36** in the diaphragm plate **18** and to shut off the supply of flock **14** to the turbine inlet.

It is to be appreciated that the method of the present invention is advantageous in practice in that the skill of the operator plays but a small part in the quality of the result. More specifically, where former methods required the use of two separate spray guns, one for flock and one for adhesive, a high degree of skill was necessary to properly blend the constituents into a uniformly mixed stream of sticky material.

The apparatus of the present invention is distinguished by its compactness in that the canister 12 encloses the operating mechanism wthin a confined volume thereby affording a high degree of portability to the unit. The flock applicating gun 12 is characterized by a design requiring no cleaning after use and embodying a minimum number of moving parts requiring repair or maintenance over long periods of use.

By reason of activating the stream of flock with a mist of adhesive reagent sprayed into a swirling stream of annular section, virtually all of the flock particles are uniformly coated with adhesive. This eliminates, to a major degree, the contamination of the atmosphere surrounding by dust from the flocking operation.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

The present invention is claimed as follows:

1. Apparatus for flocking trees and the like with light, random fibrous flock; comprising a flock supply hopper shaped to contain loose fibrous flock in a dry state and having a circular and generally flat bottom and a generally circular sidewall extending upwardly from said bottom, a rotary agitator supported for rotation about an axis generally concentric with said hopper bottom, said agitator being disposed in overyling proximate relation to said hopper bottom and being shaped to move upon rotation in a circular path located axially in proximate relation to said hopper bottom and extending radially into proximate relation to said hopper sidewall, power drive means connected to rotate said agitator, a blower mounted in underlying relation to said hopper and having a power driven rotary impeller rotatable about a generally vertical axis, intake means forming a blower intake opening upwardly from the center of said impeller and extending upwardly into coacting relation to said hopper bottom to cause said blower to suck flock and intake air from a zone immediately adjacent said hopper bottom, said hopper bottom including means for discharging flock downwardly to be sucked with intake air from a zone adjacent the hopper downwardly through the intake means into the blower, means for controlling the rate at which flock is supplied from said hopper into said intake means, a flexible conduit for air and air entrained flock, said flexible conduit having an inlet end connectable with the outlet of said blower, a movable flock discharge and wetting assembly connectable within the outlet end of said flexible conduit, said assembly including means defining an air and dry flock flow chamber and means for directing air and entrained dry flock from said flexible conduit into said chamber through an inlet into the chamber for flow through the chamber, a baffle disposed in said inlet and having a helical twist which causes air and flock to enter said flow chamber with a swirling motion, said flow chamber defining means including air nozzle means forming a generally circular outlet opening from the chamber, liquid atomizing nozzle means disposed in said flow chamber outlet in generally coaxial relation thereto to form in cooperation with said air nozzle means an annular air and dry flock discharge nozzle opening outwardly in encircling relation to said atomizing nozzle means to discharge air and flock in a trajectory that begins in coaxial encircling relation to the atomizing nozzle means, a flexible liquid supply conduit, said assembly including a liquid supply pipe interconnectable with said flexible liquid supply conduit, said liquid supply pipe cantilevering through said flow chamber in the assembly to support said atomizing nozzle means and to supply flock wetting liquid thereto, said inlet into said chamber for air and flock entering the chamber between said flock discharge nozzle and the position where said supply pipe enters the chamber, said atomizing nozzle means including channel defining means through which fluid flows in a plurality of streams that are directed into intersecting relation to each other to effect a high order of atomization of the liquid flowing through the nozzle means, said nozzle means having liquid outlet means through which liquid that is atomized by the nozzle means issues in a circular flow pattern that diverges away from the nozzle means to effect wetting of the flock entrained in the trajectory of air and flock moving beyond said liquid outlet means from said air and flock discharge nozzle, said liquid outlet means being located axially outward beyond all other structure of said assembly to preclude wetting of any structure of the assembly by atomized liquid issuing from the nozzle means, and means for controlling the flow of liquid through said pipe to said atomizing nozzle means.

2. Apparatus for flocking trees and the like with light, random fibrous flock; comprising a flock supply hopper shaped to contain loose fibrous flock in a dry state, a power driven agitator in said hopper, a flock blower mounted in underlying relation to said hopper and having a power driven rotary impeller rotatable about a vertical axis, intake means forming a blower intake opening upwardly from the center of said impeller and extending upwardly into coacting relation to said hopper to cause said blower to suck flock and intake air from a zone adjacent the underside of said hopper, said hopper including means for discharging flock from the lower portion of the hopper to be sucked with intake air from a zone adjacent the hopper downwardly through the intake means into the blower, a flexible conduit for air and air entrained flock, said flexible conduit having an inlet end connectable with the outlet of said blower, a movable flock discharge and wetting assembly connectable with the outlet end of said flexible conduit, said assembly including means defining an air and dry flock flow chamber and means for directing air and entrained dry flock from said flexible conduit into said chamber through an inlet into the chamber for flow through the chamber, baffle means disposed in said inlet for causing the air and flock to enter said flow chamber with a swirling motion, said flow chamber defining means including air nozzle means forming a generally circular outlet opening outwardly from the chamber, liquid atomizing nozzle means disposed in said flow chamber outlet to form in cooperation with said air nozzle means an annular air and dry flock discharge nozzle opening outwardly alongside said atomizing nozzle means to discharge air and flock in a trajectory extending past and beyond said atomizing nozzle means, a flexible liquid supply conduit, said assembly including a liquid supply pipe interconnectable with said flexible liquid supply conduit, said liquid supply pipe extending through said flow chamber in the assembly to support said atomizing nozzle means and to supply flock wetting liquid thereto, said atomizing nozzle means including channel defining means through which fluid flows in a plurality of streams that are directed into intersecting relation to each other to effect a high order of atomization of the liquid flowing through the nozzle means, said nozzle means having liquid outlet means through which liquid that is atomized by the nozzle means issues in a flow pattern that diverges away from the nozzle means to effect wetting of the flock entrained in the trajectory of air and flock moving beyond said liquid outlet means from said air and flock discharge nozzle, said nozzle means being located axially to position said liquid outlet means axially outward beyond all other structure of said assembly to preclude wetting of any structure of the assembly by atomized liquid issuing from the nozzle means, and means for controlling the flow of liquid through said pipe to said atomizing nozzle means.

3. Apparatus for flocking trees and the like with light, random fibrous flock, comprising a flock supply container shaped to contain loose fibrous flock in a dry state, a power driven agitator in said hopper, a flock blower, means for admitting flock from said container and air into

the intake of said blower, a flexible conduit for air and air entrained flock, said flexible conduit having an inlet end connectable with the outlet of said blower, a movable flock discharge and wetting assembly connectable with the outlet end of said flexible conduit, said assembly including means defining an air and dry flock flow chamber and means for directing air and entrained dry flock from said flexible conduit into said chamber for flow through the chamber, said flow chamber defining means including air and flock nozzle means forming an outlet opening outwardly from the chamber, liquid atomizing nozzle means disposed in generally coaxial relation to said flow chamber outlet so that said air and flock nozzle means forms an air and dry flock discharge nozzle opening outwardly alongside said atomizing nozzle means to discharge air and flock in a trajectory extending past and beyond said atomizing nozzle means, a flexible liquid supply conduit, said assembly including liquid supply pipe means interconnectable with said flexible liquid supply conduit, said liquid supply pipe means extending through said flow chamber in the assembly to support said atomizing nozzle means and to supply flock wetting liquid thereto, said atomizing nozzle means including channel defining means for channeling liquid supplied through said pipe means into a plurality of streams that are directed into intersecting relation to each other to effect a high order of atomization of the liquid flowing through the nozzle means, said nozzle means having liquid outlet means through which liquid that is atomized by the nozzle means issues in a flow pattern that diverges away from the nozzle means to effect wetting of the flock entrained in the trajectory of air and flock moving beyond said liquid outlet means from said air and flock discharge nozzle; said apparatus including said assembly being free of structure movable with said assembly and being disposed within said flow pattern in which liquid issues from said liquid outlet means of said atomizing nozzle means, and means for controlling the flow of liquid to said atomizing nozzle means.

4. Apparatus for flocking trees and the like with light, random fibrous flock, comprising a flock supply container shaped to contain loose fibrous flock in a dry state, an air and flock blower, means for admitting flock from said container into the stream of air that moves through said blower, a flexible conduit for air and air entrained flock, said flexible conduit having an inlet end connectable with the outlet of said blower, a movable flock discharge and wetting assembly connectable with the outlet end of said flexible conduit, said assembly including means defining an air and dry flock flow chamber and means for directing air and entrained dry flock from said flexible conduit into said flow chamber for flow through the chamber, said flow chamber defining means including air and flock nozzle means forming an air and flock outlet opening outwardly from said flow chamber, said assembly including liquid atomizing nozzle means disposed in a predetermined position adjacent said air and flock nozzle means so that said air and flock outlet opens outwardly alongside said atomizing nozzle means from said chamber to discharge air and flock in a trajectory extending past and beyond said atomizing nozzle means, connector means on said assembly adapted to connect with a flexible liquid supply conduit and defining an inlet for flock wetting liquid, said assembly including means defining a liquid passage extending from said inlet to said atomizing nozzle means to supply liquid under pressure to the latter, said atomizing nozzle means including means for effecting atomization of the liquid flowing therethrough, and said atomizing nozzle means having liquid outlet means through which liquid issues to form a flow pattern of atomized liquid that diverges away from the nozzle means to effect wetting of the flock entrained in the trajectory of air and flock moving beyond said liquid outlet means from said air and flock outlet; said apparatus including said assembly being free of functional structure movable with said assembly and being disposed in said flow pattern in which liquid issues from said liquid outlet means of said atomizing nozzle means.

5. Apparatus for flocking trees and the like with light, random fibrous flock; comprising a flock supply hopper shaped to contain loose fibrous flock in a dry state and having a generally circular bottom and a generally circular sidewall extending upwardly from said bottom, a rotary agitator supported for rotation about a generally vertical axis substantially concentric with said hopper bottom, said agitator being disposed in overlying proximate relation to said hopper bottom and being shaped to move upon rotation in a circular path located axially in proximate relation to said hopper bottom and extending radially into proximate relation to said hopper sidewall, electrically powered drive means connected to rotate said agitator, an electrically powered flock blower mounted in underlying relation to said hopper and having a power driven rotary impeller rotatably about a generally vertical axis, intake means forming a blower intake opening upwardly from the center of said impeller and extending upwardly into coacting relation to said hopper bottom to cause said blower to suck flock and intake air from a zone adjacent said hopper bottom, said hopper bottom including means for discharging flock downwardly to be sucked with intake air from a zone adjacent the hopper downwardly through said intake means into the blower, a flexible conduit for air and air entrained flock said flexible conduit having an inlet end connectable with the outlet of said blower, a movable flock discharge and wetting assembly connectable with the outlet end of said flexible conduit, said assembly including means defining an air and dry flock flow chamber and means for directing air and entrained dry flock from said flexible conduit into said chamber through an inlet into the chamber for flow through the chamber, said flow chamber defining means including air nozzle means forming a generally circular outlet opening from the chamber, said assembly including liquid atomizing nozzle means disposed in said flow chamber outlet in generally coaxial relation thereto and forming in cooperation with said air nozzle means an annular air and dry flock discharge nozzle opening outwardly in encircling relation to said atomizing nozzle means to discharge air and flock in a trajectory that begins in coaxial encircling relation to the atomizing nozzle means, a flexible liquid supply conduit adapted to be connected to a municipal water supply system, said assembly including liquid supply pipe means interconnectable with said flexible liquid supply conduit, said liquid supply pipe means cantilevering through said flow chamber in the assembly to support said atomizing nozzle means and to supply flock wetting liquid thereto, said inlet into said chamber for air and flock entering the chamber between said flock discharge nozzle and the position where said pipe means enters the chamber, said nozzle means having liquid outlet means through which liquid that is atomized by the nozzle means issues in a flow pattern that diverges away from the nozzle means to effect wetting of the flock entrained in the trajectory of air and flock moving beyond said liquid outlet means from said air and flock discharge nozzle, and said apparatus including said assembly being free of functional structure movable with the assembly and being disposed in said flow pattern in which liquid issues from said liquid outlet means of said atomizing nozzle means.

6. Apparatus for flocking trees and the like with light, random fibrous flock, comprising a flock supply container shaped to contain loose fibrous flock in a dry state, an air and flock blower, means for admitting flock from said container into the stream of air that moves through said blower, a flexible conduit for air and air entrained flock, said flexible conduit having an inlet end connectable with the outlet of said blower, a movable flock discharge and wetting assembly connectable with the outlet end of said flexible conduit, said assembly including means defining an air and dry flock flow chamber and means for

directing air and entrained dry flock from said flexible conduit into said chamber for flow through the chamber, said flow chamber defining means including air and flock nozzle means forming an air and flock outlet opening outwardly from said flow chamber, said assembly including liquid atomizing nozzle means disposed in a predetermined position adjacent said air and flock nozzle means so that said air and flock outlet opens outwardly alongside said atomizing nozzle means from said chamber to discharge air and flock in a trajectory extending past and beyond said atomizing nozzle means, a flexible liquid supply conduit adapted to be connected to a municipal water supply system, said assembly including liquid passage means interconnectable with said flexible liquid supply conduit and connecting with said atomizing nozzle means to supply liquid under pressure thereto, said atomizing nozzle means including means for effecting atomization of the liquid flowing therethrough, said atomizing nozzle means having liquid outlet means through which liquid issues to form a flow pattern of atomized liquid that diverges away from the nozzle means to effect wetting of the flock entrained in the trajectory of air and flock moving beyond said liquid outlet means from said air and flock outlet, and said atomizing nozzle means being located axially to position said outlet means axially outward beyond all other structure movable with the assembly to thereby preclude wetting of any structure of the apparatus by atomizing liquid issuing from the nozzle means.

7. Apparatus for flocking trees and the like with light, random fibrous flock, comprising a flock supply container shaped to contain loose fibrous flock in a dry state, an air and flock blower, means for admitting flock from said container into the stream of air that moves through said blower, a flexible conduit for air and air entrained flock, said flexible conduit having an inlet end connectable with the outlet of said blower, a movable flock discharge and wetting assembly connectable with the outlet end of said flexible conduit, said assembly including means defining an air and dry flock flow chamber and an air and flock inlet into the flow chamber, means for directing air and flock from the outlet end of said flexible conduit through said inlet into said flow chamber for flow through the chamber, a baffle disposed in said inlet for causing air and flock to enter the flow chamber with a swirling motion, said flow chamber defining means including air and flock nozzle means forming an air and flock outlet opening outwardly from said flow chamber, liquid atomizing nozzle means disposed in a predetermined position adjacent said air and flock nozzle means so that said air and flock outlet opens outwardly alongside said atomizing nozzle means from said flow chamber to discharge air and flock in a trajectory extending past and beyond said atomizing nozzle means, a flexible liquid supply conduit, said assembly including liquid passage means interconnectable with said flexible liquid supply conduit and connecting with said atomizing nozzle means to supply liquid under pressure thereto, said atomizing nozzle including channel defining means through which liquid flows in a plurality of streams that are directed into intersecting relation to each other to effect atomization of the liquid flowing through the nozzle means, and said nozzle means having liquid outlet means through which liquid issues to form a flow pattern of atomized liquid that diverges away from the nozzle means to effect wetting of the flock entrained in the trajectory of air and flock moving beyond said liquid outlet means from said air and flock discharge nozzle; said apparatus including said assembly being free of functional structure movable with said assembly and being disposed in said flow pattern in which liquid issues from said liquid outlet means of said atomizing nozzle means.

8. Apparatus for flocking trees and the like with light, random fibrous flock; comprising a flock supply hopper shaped to contain loose fibrous flock in a dry state and having a circular and generally flat bottom and a generally circular sidewall extending upwardly from said bottom, a rotary hub centrally disposed in relation to said bottom for rotation about a generally vertical axis, a plurality of generally horizontal flock feeding arms diverging radially from said hub in substantially equally spaced relation to each other and in overlying proximate relation to said bottom for rotation with the hub, one of said arms being curved at its outer end and extending into close proximity to said sidewall to move flock inwardly from the sidewall, other arms of said plurality of arms terminating substantial distances radially inward of the radially outer extremity of said one arm, a power drive connected to said hub to rotate the hub and said arms, said bottom defining therein a flock outlet area through which flock is discharged from the hopper upon rotation of said arms; said flock outlet area extending over a flock discharge zone of said hopper bottom that subtends to the axis of said hub a radial angle that is equal approximately to a whole multiple of the radial angle between adjacent ones of said arms so that upon rotation of said hub a substantially constant number of said arms, equal to at least two in number, moves in overlying relation to said discharge zone to effect the discharge of flock at a substantially constant rate through said outlet area; an air and flock blower mounted in underlying relation to said hopper and having a power driven rotary impeller rotatable about a generally vertical axis, intake means forming an air and flock intake passage extending upwardly from the center of said impeller into underlying relation to said flock discharge zone of said hopper bottom to receive flock from said flock outlet area, said intake means defining an air intake opening into said intake passage adjacent the underside of said hopper bottom, means for controlling the rate at which flock is discharged through said outlet area into said intake passage, a flexible conduit for air and air entrained flock, said flexible conduit having an inlet end connectable with the outlet of said blower, a movable flock discharge and wetting assembly connectable with the outlet end of said flexible conduit, said assembly including means defining an air and dry flock flow chamber and means for directing air and entrained dry flock from said flexible conduit into said chamber for flow through the chamber, said flow chamber defining means including air and flock nozzle means forming an air and flock outlet opening outwardly from the chamber, liquid atomizing nozzle means disposed adjacent said air and flock nozzle so that said air and flock outlet opens outwardly alongside said atomizing nozzle means from said chamber to discharge air and flock in a trajectory extending past and beyond said atomizing nozzle means, said assembly including means defining a liquid supply inlet and a passage extending from said inlet to said atomizing nozzle means to supply liquid under pressure thereto, said atomizing nozzle means including means for effecting atomization of the liquid flowing therethrough, and said atomizing nozzle means having liquid outlet means through which liquid issues to form a flow pattern of atomized liquid that diverges away from the nozzle means to effect wetting of the flock entrained in the trajectory of air and flock moving beyond said liquid outlet means from said air and flock outlet; said apparatus including said assembly being free of functional structure movable with said assembly and disposed in said flow pattern in which liquid issues from said liquid outlet means of said atomizing nozzle means.

9. Apparatus for flocking trees and the like with light, random fibrous flock; comprising a flock supply hopper shaped to contain loose fibrous flock in a dry state and having a circular bottom and a generally circular sidewall extending upwardly from said bottom, a rotary hub centrally disposed in relation to said bottom for rotation about a generally vertical axis, a plurality of generally horizontal flock feeding arms diverging radially from said hub in sub-

stantially equally spaced relation to each other and in overlying proximate relation to said bottom for rotation with the hub, one of said arms being curved at its outer end and extending into close proximity to said sidewall to move flock inwardly from the sidewall, other arms of said plurality of arms terminating substantial distances radially inward of the radially outer extremity of said one arm, a power drive connected to said hub to rotate the hub and said arms, said bottom defining therein a flock discharge outlet area through which flock is discharged from the hopper upon rotation of said arms; said flock discharge area extending over a flock discharge zone of said hopper bottom that subtends to the axis of said hub a radial angle that is equal approximately to a whole multiple of the radial angle between adjacent ones of said arms so that upon rotation of said hub a substantially constant number of said arms, equal to at least two in number, moves in overlying relation to said outlet zone to effect the discharge of flock at a substantially constant rate through said outlet area; an air and flock blower mounted in adjacent relation to said hopper, intake means forming an air and flock intake passage extending from said blower into underlying relation to said flock discharge zone of said hopper bottom to receive flock from said flock discharge outlet area, means for controlling the rate at which flock is discharged through said outlet area into said intake passage, a flexible conduit for air and air entrained flock, and said flexible conduit having an inlet end connectable with the outlet of said blower to receive a fast moving stream of air and entrained flock from the blower.

10. Apparatus for flocking trees and the like with light, random fibrous flock; comprising a flock supply hopper shaped to contain loose fibrous flock in a dry state and having a circular and generally flat bottom and a generally circular sidewall extending upwardly from said bottom, a rotary agitator supported for rotation about an axis generally concentric with said hopper bottom, said agitator being disposed in overlying proximate relation to said hopper bottom and being shaped to move upon rotation in a circular path located axially in proximate relation to said hopper bottom and extending radially into proximate relation to said hopper sidewall, electrically powered drive means connected to rotate said agitator, an electrically powered flock blower mounted in underlying relation to said hopper and having a power driven rotary impeller rotatable about a generally vertical axis, said hopper bottom defining a flock outlet disposed substantially in overlying relation to the center of said impeller, blower intake means extending upwardly from said blower into adjacent relation to said hopper bottom and defining an air and flock intake passage extending vertically upwardly from the center of said impeller to said flock outlet in the hopper bottom to receive flock from said outlet, means for controlling the rate at which flock is discharged from the hopper through said flock outlet in the hopper bottom into said air and flock intake passage, said intake means defining adjacent said hopper bottom an air intake opening through which air from outside the hopper is sucked into said air and flock intake passage to move downwardly through the passage into the blower to form a vehicle which carries down into and through the blower flock discharged from said flock outlet, a flexible conduit for air and air entrained flock, and said flexible conduit having an inlet end connectable with the outlet of said blower.

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