July 29, 1969 J. A. BEALS 3,458,135

HEADBOX SHOWER APPARATUS

Filed Oct. 10, 1967 2 Sheets-Sheet 1

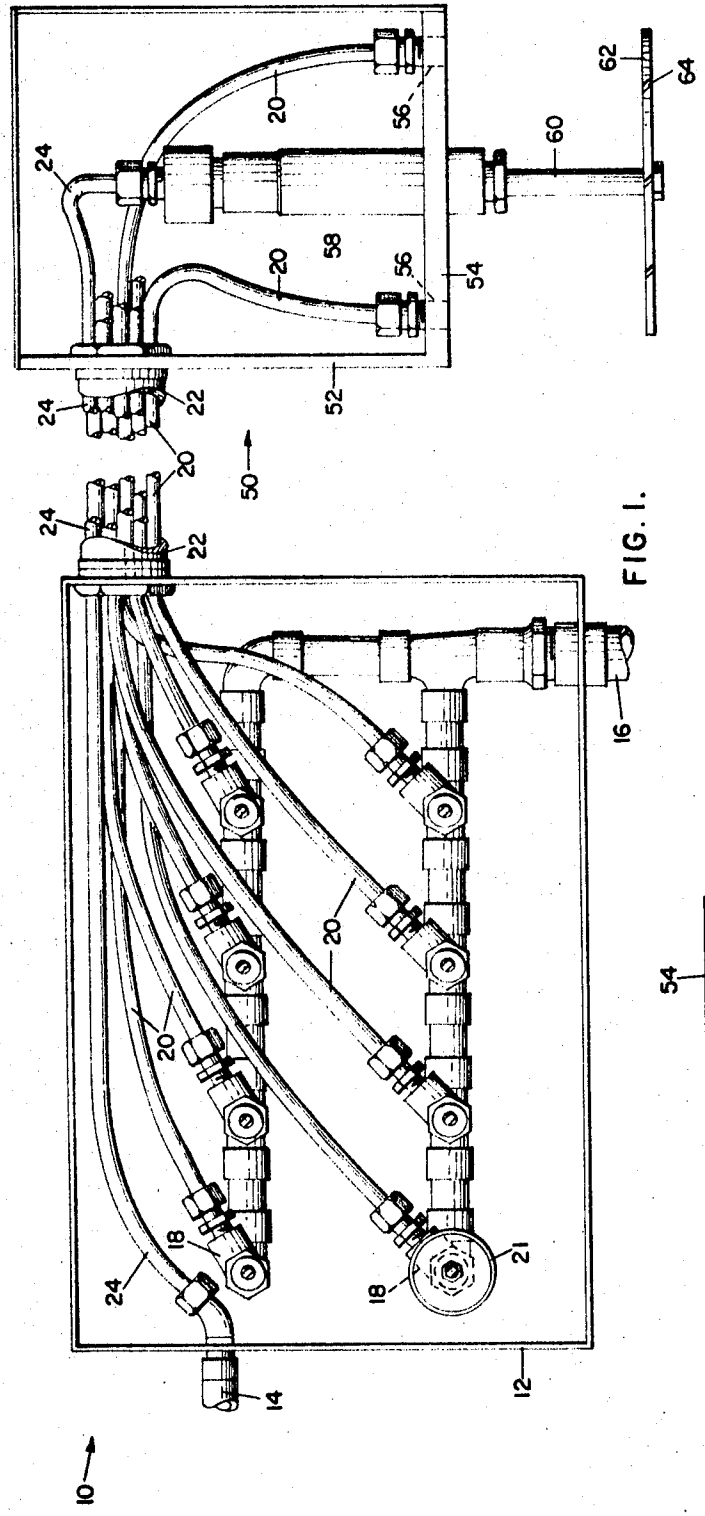


FIG. 1.

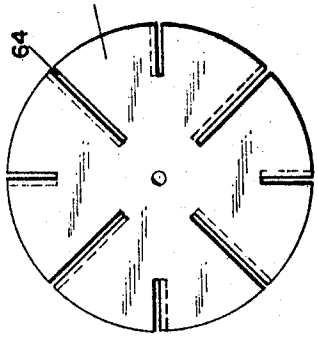


FIG. 3.

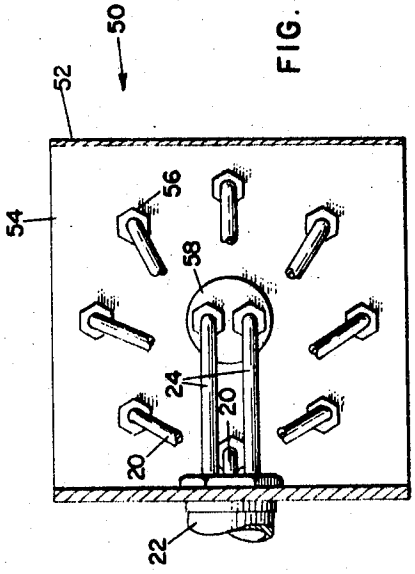


FIG. 2.

INVENTOR.
JOHN ALDEN BEALS
BY Kenwood Ross and
Chester E. Flavin
ATTORNEYS.

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HEADBOX SHOWER APPARATUS

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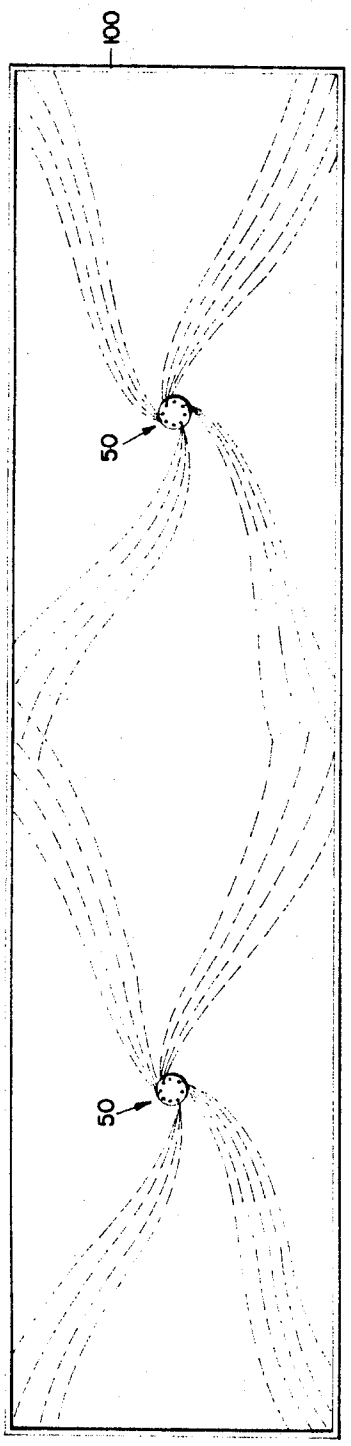


FIG. 5.

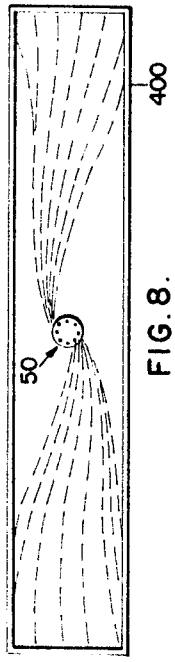


FIG. 8.

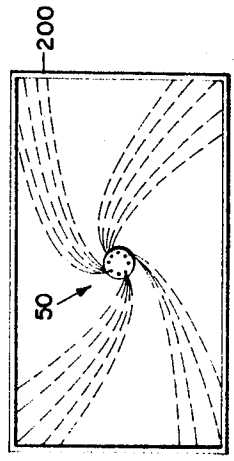


FIG. 6.

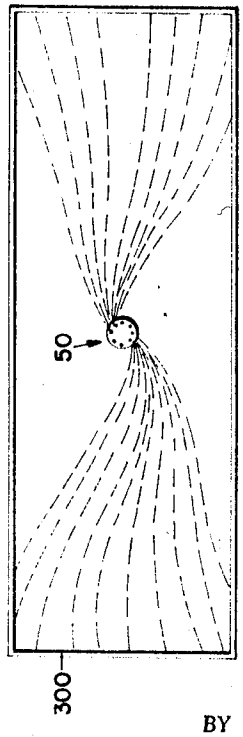


FIG. 7.

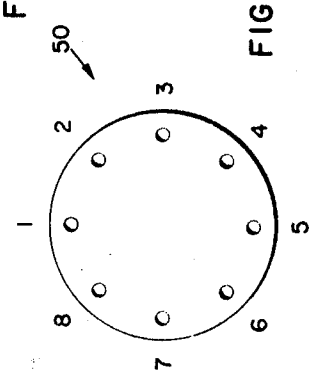


FIG. 4.

INVENTOR.
JOHN ALDEN BEALS
BY Kenwood Ross and
Chester E. Flavin
ATTORNEYS.

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3,458,135

HEADBOX SHOWER APPARATUS

John Alden Beals, Glens Falls, N.Y., assignor to Pressure Systems, Inc., Glens Falls, N.Y.

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Int. Cl. B05b 3/02, 3/00; F23d 11/04
U.S. Cl. 239—222.11 5 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for directing a fluid spray upon the surface of a liquid contained within a headbox comprising a plurality of circumferentially-disposed nozzles, each nozzle having an independent fluid supply and control means, and a slotted rotatable distribution plate disposed below said nozzles, each nozzle directing an impinging fluid spray onto the distribution plate and through the slots thereof, wherefore the fluid is atomized and flung outwardly in the form of a heavy rain by the centrifugal force generated by rotation of the distribution plate.

BACKGROUND OF THE INVENTION

Field of the invention

Shower apparatus for directing a fluid spray onto the surface of a liquid pond contained within the headbox of a papermaking machine.

Description of the prior art

Showers of the prior art have been deficient in that they are costly and/or complicated in their structure, unreliable in the results obtained, and ineffective in achieving a fine spray coverage of the entire pond area.

SUMMARY OF THE INVENTION

Among primary objects of the invention are the provision of headbox shower apparatus which is inexpensive in its manufacture, simple in its structure and reliable in its use.

Another object is to provide shower apparatus including a plurality of shower nozzles, each having its own fluid supply and control means, wherefore spray patterns of virtually endless variety may be obtained.

As another feature worthy of particular note, shower apparatus of the invention may be used to effectively spray the liquid ponds of headboxes of virtually any size and/or shape.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a broken view in side elevation of the apparatus of the invention;

FIG. 2 is a view in top plan of the shower subassembly of the apparatus;

FIG. 3 is a top plan view of the distributor of the shower subassembly of the apparatus;

FIG. 4 is a schematic showing of the shower nozzle orientation; and

FIGS. 5–8 are schematic showings of several typical headbox installations showing various spray patterns obtainable according to predetermined nozzle arrangements and actuation.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Headbox shower apparatus embodying the invention comprises a water and air supply and control subassembly, generally indicated by **10**, suitably secured to and conveniently located in proximity to the papermaking machine headbox, and one or more shower subassemblies, generally indicated by **50**, operatively connected to said water and air supply and control subassembly **10**, and

suitably secured within the interior of the headbox so as to be disposed immediately above the level of the fluid contained within the headbox.

With reference first to water and air supply and control subassembly **10**, same includes a suitable housing **12** having air and water inlets **14** and **16** respectively entering thereinto, each being connected to a suitable pressurized source, not shown.

A plurality of hand-operated nozzle control valves **18**, disposed within housing **12**, are interconnected in series to each other and to water inlet **16** by the usual couplings, T's, elbows and the like, each valve carrying a control handle **20**.

Emanating from each valve **18** is a water supply line **20** which passes outwardly from the housing through a tubular sheath **22** to shower subassembly **50**, the sheath connecting between the housing and shower subassembly, each line **20** being individually controlled by its respective valve **18**.

Air lines **24**, connected to air inlet **14** also pass outwardly from the housing through sheath **22** to shower subassembly **50**.

Shower subassembly **50** includes a housing **52**, a shower head support **54** serving as the bottom wall of said housing and a plurality of equi-spaced circumferentially-arranged downwardly-directed shower heads **56** of conventional design carried by said shower head support.

A vertically-upright air motor **58** is disposed centrally within said housing and extends outwardly therefrom through a suitable opening provided in shower head support **54**.

Air lines **24** and water lines **20** enter into housing **52** from sheath **22**, the air lines being connected to the upper end of air motor **58**, and each water line being connected to one of said shower heads **56** and being individually controlled by its respective valve **18**.

A motor shaft **60** extends downwardly from air motor **58** and has a disc-like distribution plate **62** fixed to its lower free end. Motor shaft **60** is mounted for clockwise rotation.

A plurality of angularized radial slots **64** are provided through distribution plate **62** and extend inwardly from the outer periphery thereof. The slots may be of the same length, or may be staggered, as shown, one short and one long, etc. The staggered arrangement is preferred, in order that the water passing through the plate from the nozzles will not become too concentrated centrally therebelow.

Slots **64** correspond in number and arrangement to spray nozzles **56**, and the diameter of distribution plate **62** is substantially identical to that defined by the arrangement of the spray nozzles.

Water is directed downwardly by each spray nozzle, enters its respective slot and is flung downwardly and outwardly by the centrifugal force generated by rotation of the distribution plate. The slots, being angularized, having a cutting effect to slice each water jet and deliver it onto the pond surface in the form of an atomized heavy rain.

The amount of water delivered to each nozzle may be individually controlled; certain nozzles may be completely shut off; and the speed of rotation of the distribution plate may be varied to produce a wide variety of atomized spray patterns.

FIG. 4 is a schematic showing of the normal spray nozzle orientation.

FIGS. 5 through 8 show several of the patterns which can be produced by various spray nozzle subassembly arrangements within headboxes of various sizes and shapes.

In FIG. 5, for example, two spray nozzle subassemblies **50** are disposed along the horizontal axis of an elongated rectangular headbox **100** with only nozzles **2**,

4, 6 and 8 being operative to effectively spray all areas and corners of the headbox.

In FIG. 6, only one spray nozzle subassembly is utilized, with nozzles 2, 4, 6 and 8 being operative to spray all areas and corners of a smaller rectangular headbox 200.

In FIGS. 7 and 8, a single shower subassembly 50, with only nozzles 1 and 5 operative, is utilized with headboxes 300 and 400 respectively.

The number of shower subassemblies employed, the nozzles thereof which are operative and the speed of rotation of the distribution plate will be dictated by the size and shape of the particular headbox to be sprayed.

The unit may also be provided with an electrically-powered variable speed compensating drive, wherefore, as more water is applied to the distribution plate, the current is automatically increased to the motor to maintain the constant speed pre-selected by the operator.

I claim:

1. Apparatus for directing a fluid spray upon the surface of a liquid contained within a headbox comprising a plurality of circumferentially-disposed nozzles, independent fluid supply and control means for each nozzle, a slotted distribution plate mounted for rotation below said nozzles and above the surface of the headbox liquid, each nozzle being adapted for directnig an impinging fluid spray onto the distribution plate and through the slots thereof, the fluid being flung downwardly and outwardly in the form of an atomized spray by the cutting action of said slots and by the centrifugal force generated by rotation of the distribution plate.

2. Apparatus according to claim 1, wherein said nozzles are equi-spaced.

3. Apparatus according to claim 1, wherein the slots in the distribution plate correspond in number and arrangement to the number and arrangement of said nozzles.

4. Apparatus according to claim 1, wherein said distribution plate is annular and the slots therein are radially-extending and angularly-disposed.

5. Apparatus according to claim 1, wherein the slots in the distribution plate are of unequal length and are staggered.

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M. HENSON WOOD, JR., Primary Examiner

BERNARD BELKIN, Assistant Examiner

U.S. Cl. X.R.

239—224, 225