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H. J. HOYT

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LIQUID DISTRIBUTING SYSTEM FOR MIXING MACHINES

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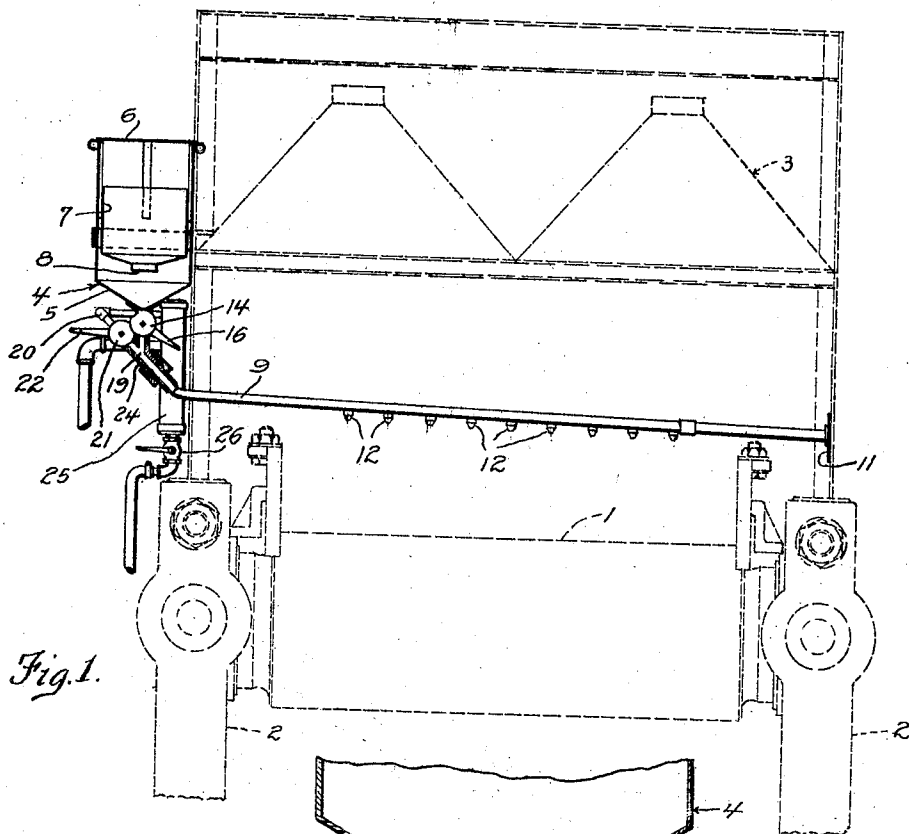


Fig. 1.

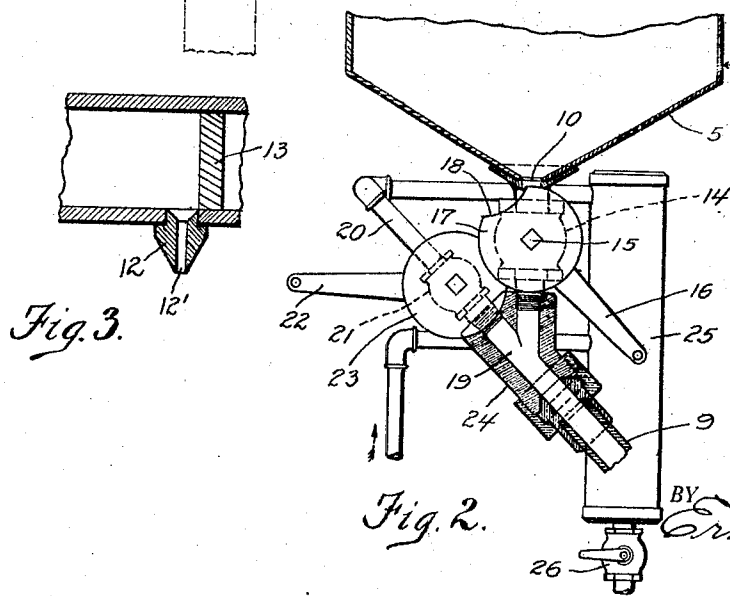


Fig. 2.

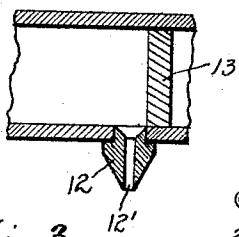


Fig. 3.

INVENTOR.
Homer J. Hoyt,

BY Ernest Robinson
HIS ATTORNEY.

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UNITED STATES PATENT OFFICE.

HOMER J. HOYT, OF DETROIT, MICHIGAN, ASSIGNOR TO MORGAN & WRIGHT, A CORPORATION OF MICHIGAN.

LIQUID-DISTRIBUTING SYSTEM FOR MIXING MACHINES.

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This invention relates to a device for supplying a liquid ingredient, such as oil, used in the manufacture of some rubber articles, to the crude rubber being compounded on a mill or other type of mixing machine.

Heretofore it has been the practice to supply a liquid ingredient to a batch of rubber or other plastic being compounded either by pouring it on from time to time or by allowing the liquid to drip from the bottom of a swinging pail suspended above the machine. These practices did not insure uniform distribution of the oil and the rubber or batch frequently accumulated at the center of the rolls. If the compounding is done on a mixing mill, the operator is required to reach over the rolls and consequently, put his arm in jeopardy. And he must remain idly at his station during most of the operation of the mill rolls merely to add a little more liquid or start the pail to swaying anew.

The present invention aims to economize in the amount of attention required of the operator in compounding and consequently, decrease the number of operators required in a mill or compounding room; to better the distribution of a liquid ingredient, such as oil, during the compounding of a batch; and to provide a type of apparatus that is readily cleansed, and insures against undesirable mixture of liquids as, for instance, when different oils are used in successive batches. Still further, the present invention enables the time of a compounding cycle of operations to be shortened as the operator may gather the ingredients for the next compounding operation on a number of mills while they are working.

With the illustrated embodiment in mind and without limiting intention, the invention may be described briefly as consisting of a container with a conduit for emptying a charge of liquid therefrom and carrying it over a mill, or other mixing machine, there to be distributed by draining through a plurality of spaced apart nozzles upon a batch of material which is being worked so as to blend the ingredients into a more or less homogeneous mass. A valve is provided in the conduit for placing it in communication with the container. Between this supply valve and the vents, or nozzles, in the conduit, an air-line is connected, it also being provided with a valve for controlling

the passage of a gaseous fluid. The two valves mentioned are preferably provided with interlocking disks on their stems having arcuate indentations in their peripheries so arranged as to allow only one valve to be opened at a time. By this means, not only is the full quantity of liquid charged into the container discharged upon the batch being compounded, but fluid under pressure, such as air, may be introduced to thoroughly blow out the conduit and clear the openings in its distributing nozzles.

A preferred embodiment of the invention is illustrated in the accompanying drawings, in which:—

Fig. 1 is a front elevation of the system as applied to a mixing mill, the latter appearing in dotted lines;

Fig. 2 is an enlarged fragmentary vertical view partly in section, showing the valve controls for the liquid and the air-line; and

Fig. 3 is an enlarged detail of the distributing conduit or pipe, showing a preferred form of one of the vents or nozzles.

In the drawings, a well-known form of mixing machine is illustrated conventionally in dotted lines, this consisting essentially of parallel and horizontally disposed rolls 1—only one of which appears—which are journaled in standards 2 carrying a super-structure or hood 3 for carrying off noxious vapors, all old and well known.

To the frame 3, or any other convenient support, is fixed a container, indicated generally at 4, having a bottom 5 of any self-draining form, such as the conical shape illustrated. And preferably, the container is provided with a hinged cover 6 and with a suspended strainer 7 in whose lower bottom wall, indicated at 8, may be provided a wire screen of a suitable mesh to collect foreign particles of a size likely to clog the system. The container drains into a conduit or pipe 9, suitably secured thereto about the opening 10 in its bottom, the pipe line being supported at its opposite end by the wall-flange 11 to the super-structure 3, or otherwise as convenient. The pipe 9 is provided with a plurality of spaced outlets or nozzles 12, which may be punched out of the pipe, or fashioned in any suitable manner, but are preferably constructed and apertured separately before being mounted, as indicated in the enlarged view Fig. 3. Very

desirably, but not necessarily, the pipe 9 is inclined so that the liquid will certainly gravitate from the container out through the nozzles. And preferably, I close the pipe 9 with a plug 13, immediately adjacent the nozzle 12 most remote from the container so that none of the liquid ingredient may be left in the line.

Between the nozzles or draining outlets 12 and the container 4, is located a valve 14, the opposite ends of whose stem 15 protrude and have mounted thereon an operating handle 16 and disk 17, respectively, the latter being notched or arcuately incised as indicated at 18. Between the nozzles 12 and the valve 14, and preferably adjacent the latter, connection is made, as indicated at 19, with an air-line 20, also equipped with a valve 21 having an operating handle 22 and notched disk 23 on the oppositely protruding ends of its stem. While the air-line may be connected in any suitable manner, I preferably employ the Y-type connection, indicated at 24, and suitable means defining a substantially unbroken passage for the oil, without cracks or grooves in which the oil is likely to collect. Preferably, but not necessarily, a separator 25 is located in the air-line between the valve 21 and the source of gaseous fluid supply to trap and collect any moisture, which may be present, in the bottom of the vessel that may be drained off, as indicated at 26.

The valves 14 and 21 are preferably equipped with means which permit opening only one of them at a time. This may be accomplished variously, but preferably by the simple construction of the notched disks 17 and 23 arranged to interlock so that when one is open, the stem of the other can not be rotated.

In operation, a pre-determined quantity of a liquid ingredient, such as oil, is poured into the strainer 7 and allowed to stand until all the liquid has passed through the sieve 8 into the self-draining bottom of the container 4. After this, when a batch on the mill rolls 1 is ready to have the oil added, the handle 16 is operated to allow the liquid to drain into the pipe 9 and out through the nozzles 12 upon the batch. The line 9, being preferably inclined, the liquid will flow by gravity and the rate of flow may be regulated by the extent to which the valve has been opened. The valve 14 is shown in open position in Fig. 2, and it will be seen that the disk 17 interlocks with the disk 23 so as to prevent air being admitted to the system from the line 20. When the oil dripping from the nozzles 12 indicates that

the container is empty, the valve 14 is closed. This brings the notch 18 into a position permitting the air-line valve 21 to be opened and air under fluid pressure forced through the pipe 9 so as to completely expel oil from the system and also to clean out the apertures 12' in the nozzles, whose tapering outside walls minimize the extent of contact of the liquid with metal exposed to the air, and consequently, minimize the collection of dust and successive accumulation of dry films of oil. The conical shape of the nozzles also prevents the oil from clinging to the pipe 9 and running down the inclined length thereof.

The advantages of the invention have already been enumerated. It will be understood that the principles of the invention may be realized in various degrees by varying the details of construction in many ways, and it is distinctly noted that the invention is intended to comprehend all mechanical changes within the principles disclosed, wherefore reference should be made to the accompanying claims for an understanding of its scope.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:—

1. A system for distributively supplying a liquid ingredient including a container, a conduit for emptying the container and conveying the liquid therefrom, said conduit being provided with a plurality of nozzles at intervals, a valve in said conduit intermediate the nozzles, and container for controlling the flow of liquid from the container to the nozzles, in combination with means for blowing out the conduit and nozzles with a gaseous fluid, and means permitting operation of the last named means only when said valve is closed.

2. A system for distributively supplying a liquid ingredient including a container, a pipe connected to the lowermost point of said container and extending therefrom at a lower elevation, a plurality of nozzles for draining liquid from the pipe at intervals, a valve in said pipe intermediate said nozzles and container, an air-line in communication with said pipe intermediate said valve and said nozzles, a second valve for controlling the passage of a gaseous fluid from said air-line, and devices operatively connected with each of said valves permitting only one of them to be opened at a time.

Signed at Detroit, county of Wayne, and State of Michigan, this 26th day of June, 1922.

HOMER J. HOYT.