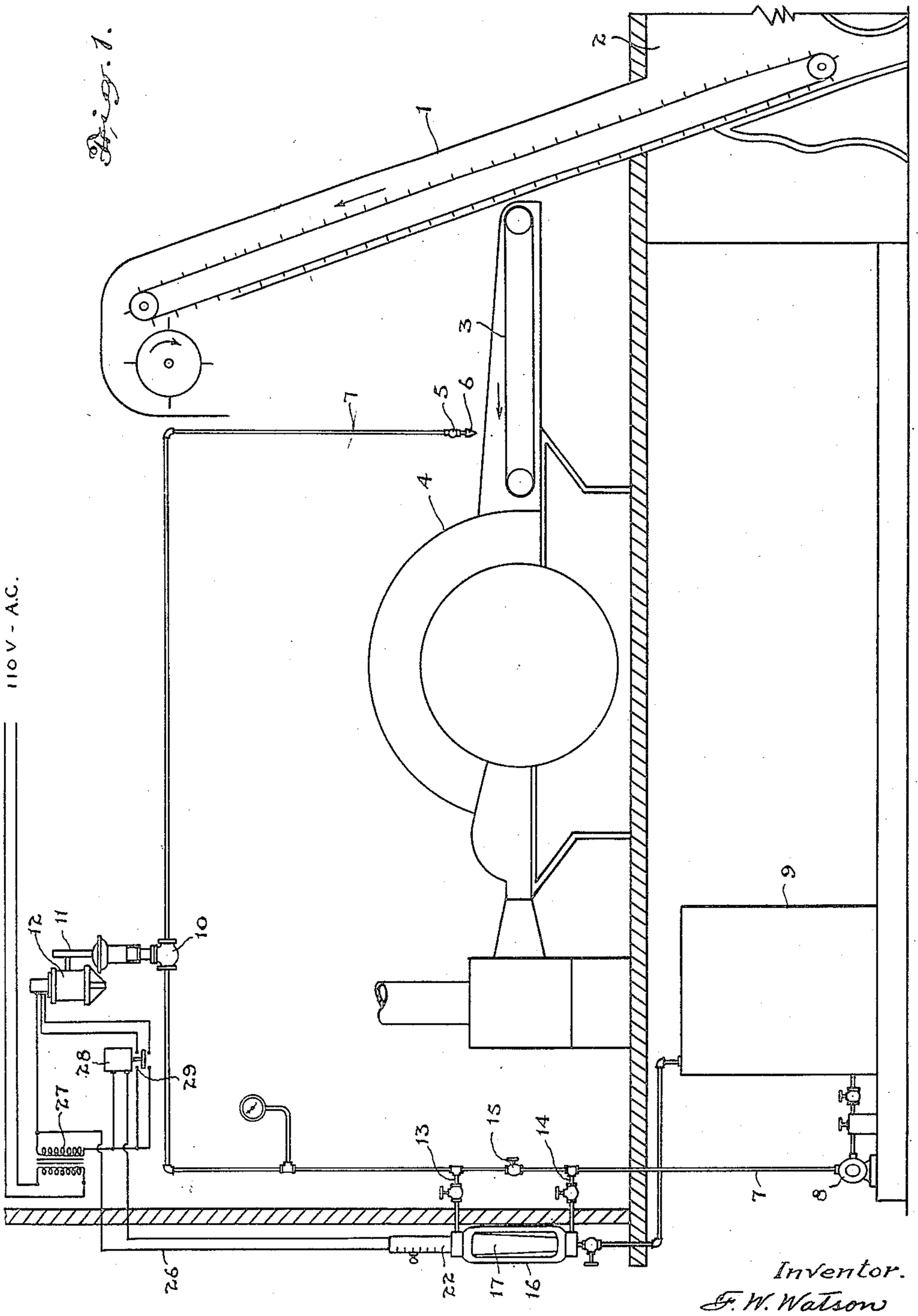
Oct. 31, 1950 F. W. WATSON 2,528,199

APPARATUS FOR OILING TEXTILE MATERIALS

Filed June 26, 1946 2 Sheets-Sheet 1

Fig. 1.



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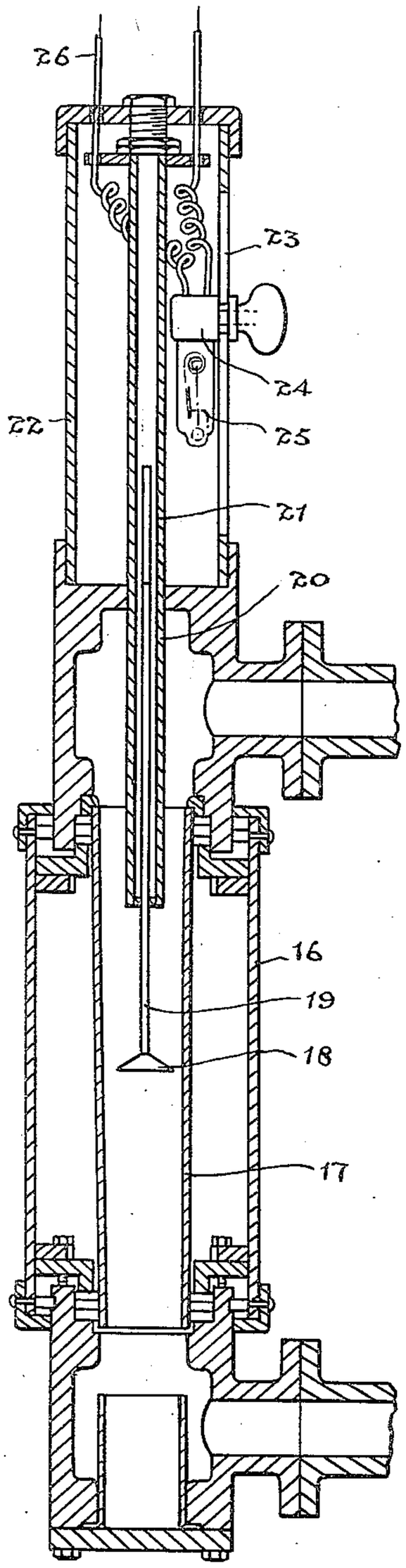

Fig. 4.

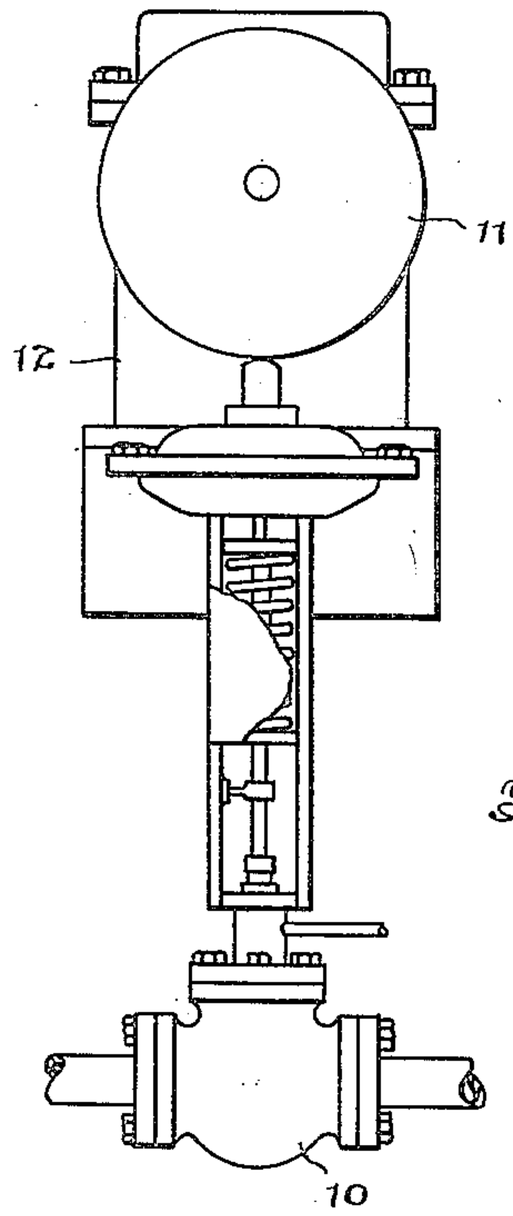

Fig. 2.

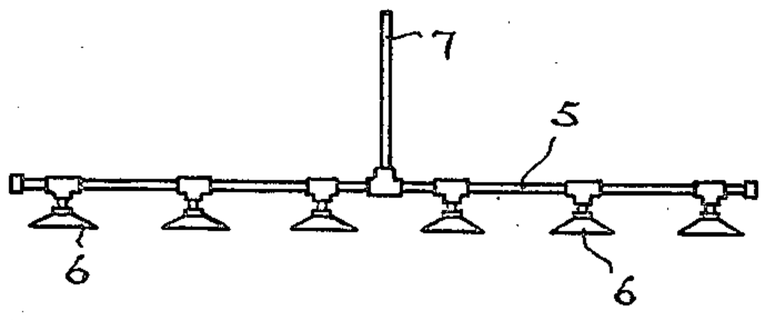

Fig. 3.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR OILING TEXTILE MATERIALS

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5 Claims. (Cl. 91—18)

1

This invention relates to improvements in an apparatus for applying softening or lubricating oil to textile materials prior to fabricating same and the principal object of the invention is to provide means for automatically controlling the delivery of oil to the textiles taken from the picker feeder and delivered to the picker in the initial stage of handling the textile material to be fabricated into yarn.

A further object is to provide an equipment which may be accurately adjusted to deliver any required volume of oil to the textile material being transferred.

A still further object is to provide an apparatus which will, in the event of failure of any of the delivery spray nozzles, automatically increase the flow through the remaining operating nozzles so that the required amount of oil delivery will be maintained.

The principal feature of the invention consists in arranging a flow control valve in the feed pipe leading from the pressure pump for feeding the oil emulsion to the spray nozzles for delivering the oil to the textile material being transferred, and controlling said valve by means of a slow speed reversible motor operated member, the operation of which is controlled by an adjustable flow meter arranged in the feed pipe between the pump and the control valve.

In the accompanying drawings Figure 1 is a diagrammatic illustration of an apparatus constructed and arranged to carry this invention into effect.

Figure 2 is an enlarged elevational view of a preferred flow control valve mechanism.

Figure 3 is a detail elevational view of the delivery nozzle arrangement.

Figure 4 is a sectional view of a preferred form of flow meter control device.

In the manufacture of textiles from wool or other materials it is necessary to apply a stipulated quantity of oil emulsion to a given quantity of material to facilitate manufacture and the oil is sprayed upon the material from suitable nozzles while it is being transferred from storage to the initial "picker" machine.

It has been the customary practice to control the flow of oil from the nozzles by the manual manipulation of a control valve while a constant pressure is maintained in the supply line by a

2

relief valve controlled pump. Such practice is very uncertain and if, as frequently occurs, any of the delivery nozzles become clogged, the amount of oil delivered to the material will be inadequate and ununiform and in any event the flow control is arbitrary being dependant upon the judgement of the attendant of the apparatus.

In carrying the present invention into effect, the usual form of picker feeder 1 feeds the fibrous materials in a broad sheet from the feed pit 2 and delivers same to the apron 3 of the picker machine 4.

Arranged over the feeder apron 3 of the picker 4 is a transverse spray pipe 5 which is provided with a plurality of suitable spray nozzles 6 which direct the oil emulsion in a fine spray over the material.

The spray pipe 5 is connected by a pipe 7 to the pressure feed pump 8 which is connected with an oil emulsion tank 9.

A flow control valve 1 is arranged in a suitable location intermediate of the length of the pipe 7. This valve is a direct action valve which is spring actuated to open and is of a well known construction and need not be described in detail.

Arranged above the valve 10 and operatively engaging the upper end of the spindle thereof, is an eccentric disc or cam 11 which is mounted on the shaft of a reversible slow speed motor mechanism 12 which may be of any suitable type the details of which form no part of this invention.

Between the valve 10 and the feed pump 8 the feed pipe 7 is provided with the spaced-apart branch pipes 13 and 14 between which is arranged a normally closed shut-off valve 15.

Connected between the ends of the branch pipes 13 and 14 is a suitable form of fluid flow meter 16, presferably of the type hereinafter described which measures the flow of fluid therethrough.

Floatably supported within the diverging tube 17 of the flow meter 16 is a cupped member 18 from which a rod 19 extends upwardly into a tube 20, said rod carrying a permanent magnet extension 21 which is in rod form. As is well understood during fluid flow through the meter with the valve 15 closed the cup-shaped member or "float" 18 assumes a position in the diverging or tapered tube 17 whereby the annular opening

between the float and tube wall is such as to provide the required flow area corresponding to the flow rate through the tube. Arranged outside of and spaced from the tube **20** is a casing **22** which has a longitudinal slot **23** in which is slidably mounted a block **24**. This block may be secured in any desired position in the length of the casing **22**. Suspended from the block **24** is a small mercury switch **25** in tube form in which a magnetically controllable pivotal contact member is mounted. The pivotal member when influenced by the magnetic field of the movable magnet is caused to tilt to close an electric circuit through the wires **26** connected through a suitable transformer **27** to the solenoid of a double throw relay **28** so that when the flow of oil through the float meter **16** reaches a given rate or amount the cupped member **18** has operated to move the magnet to operate the switch to close the relay circuit.

Contacts **29** are arranged in the relay to be closed when the relay is energized as described and a flow of current is directed through the motor device **12** to rotate the cam **11** in one direction.

When the meter **16** operates so that its float controlled magnet effects the breaking of the circuit through the switch **25**, the solenoid of the transformer **27** releases its plunger to break the circuit to the cam operating motor but it immediately closes the contacts **29** of the relay to direct current through the motor **12** to reverse the movement of the valve operating cam **11**.

The valve **10** is operated by the cam **11** to slowly choke the oil flow when such flow becomes excessive and operates the meter **16** to close the motor circuit and when the flow decreases the meter **16** reverses the motor circuit and the spring-opened valve follows the slowly moving cam and again increases the flow. The result of this operation of the motor **12** is that while the machine is in operation the motor is slowly but continually "hunting" that is, moving the cam **12** slowly back and forth thus manipulating the valve to maintain a substantially constant flow of oil to the nozzles.

If however a nozzle becomes clogged the flow will decrease and the valve control motor will continue to operate to permit the valve to open further and increase the flow through the other nozzles maintaining a substantially constant flow through the meter and a constant volume of oil deposited on each unit length of material fed beneath the nozzles.

The device as herein described is extremely simple and utilizes well known standard mechanisms but it has been found in practice to operate very effectively and maintains an automatic flow control which ensures the textile materials being uniformly treated at all times that is, each unit length of material passing beneath the spray nozzles will receive an equal volume of oil independent of the plugging of one or more of the nozzles. It will of course be understood that any unevenness in the actual oil distribution over the surface of each unit length of material caused by the blockage of a nozzle is equalized in the handling and mixing of the material in subsequent operations which effect the spreading of the oil uniformly throughout the material fibres.

The control valve has been herein shown as being operated by a motor operated cam but it will be appreciated that such control valve might be operated hydraulically and the hydraulic mechanism controlled by suitable means operated through the relay.

What I claim as my invention is:

1. Apparatus for oiling textile materials comprising a plurality of spray nozzles arranged above the path of fibres to be oiled, an oil supply tank, an oil feed line connecting said tank with said spray nozzles, a pressure oil pump connected in said line to deliver oil from said tank to said nozzles under pressure, a meter connected in said line to measure rate of oil flow through said line, a valve arranged in said line to regulate the flow passage to said nozzles, and means controlled by said meter and operatively connected with said valve to control the flow passage to said nozzles in accordance with the rate of flow through said line to maintain a substantially constant flow rate through said line and hence a substantially constant total volume oil discharge through said nozzles independent of variations of oil flow through an individual nozzle.

2. A device as claimed in claim 1 in which the valve-operating means controlled by said meter comprises a continually hunting reversible motor-driven cam arranged to effect the closing and opening of said valve to regulate the flow of oil to the spray nozzles, an electric relay for controlling the direction of movement of said motor-driven cam, and means operated by said flow meter for operating said relay.

3. A device as claimed in claim 1 in which the valve arranged in the pipe line is spring-operated to increase the flow passage to said nozzles and said spring means controlling said valve comprises a rotatable cam operating to oppose the spring opening of said valve, a slow speed reversible motor mechanism operating said cam, a double-throw electric relay connected to said motor mechanism, an electric circuit connected through said relay, and a switch for opening and closing said relay circuit and operated by said flow meter and maintaining said motor in a continual hunting condition.

4. Apparatus for oiling textile material comprising a plurality of spray nozzles arranged above the path of a mat of fibres to be oiled, an oil supply tank, a pipe line connecting said tank with said spray nozzles, a pressure oil pump connected in said pipe line to deliver oil under pressure to said nozzles, a valve arranged in the pipe line to regulate the flow passage to said nozzles, a tapered tube flow meter arranged in said pipe line, and means controlled by said flow meter and operatively connected with said valve to control the flow passage to said nozzles in accordance with the rate of flow through said line to maintain a substantially constant flow rate through said line to provide a substantially constant total volume oil discharge through said nozzles independent of variations of oil flow through an individual nozzle.

5. Apparatus for oiling textile materials comprising a plurality of spray nozzles arranged above the path of a mat of fibres to be oiled, an oil supply tank, a pipe line connecting said tank and said spray nozzles, a pressure oil pump connected in said pipe line to deliver oil under pressure to said nozzles, a valve arranged in said pipe line and controlling the flow passage to said nozzles, a tapered tube flow meter arranged in said pipe line, a float operating said tapered tube in accordance with the rate of flow through said

tube, a magnetic extension carried by said float, a switch operated by said magnetic extension, and a reversible motor operatively connected through said switch and controlling said valve to regulate the flow passage to said nozzles in accordance with the rate of flow through said line to maintain a substantially constant flow rate through said line and hence a substantially constant total volume oil discharge through said nozzles.

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