

[54] **OSCILLATOR SYSTEM FOR PAPER MACHINE**

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[58] Field of Search 15/256.53; 60/533, 539

[56] **References Cited**

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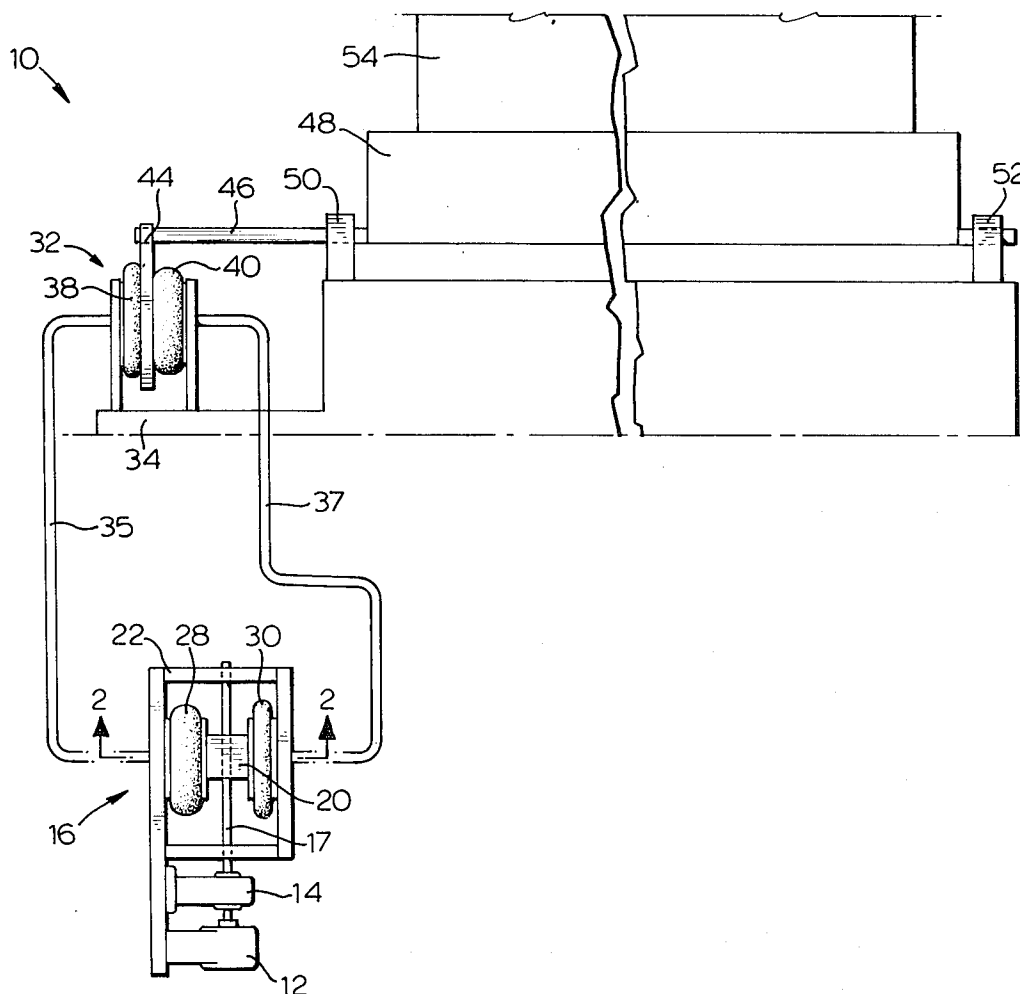
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[57] **ABSTRACT**

Transverse oscillation of a paper machine doctor utilizes a liquid-driven actuator having a pair of opposed bellows chambers to produce the desired "to and fro" motion, with each chamber connected in liquid displacing relation with a corresponding two chambered pump driven by a rotary prime-mover.

2 Claims, 2 Drawing Figures



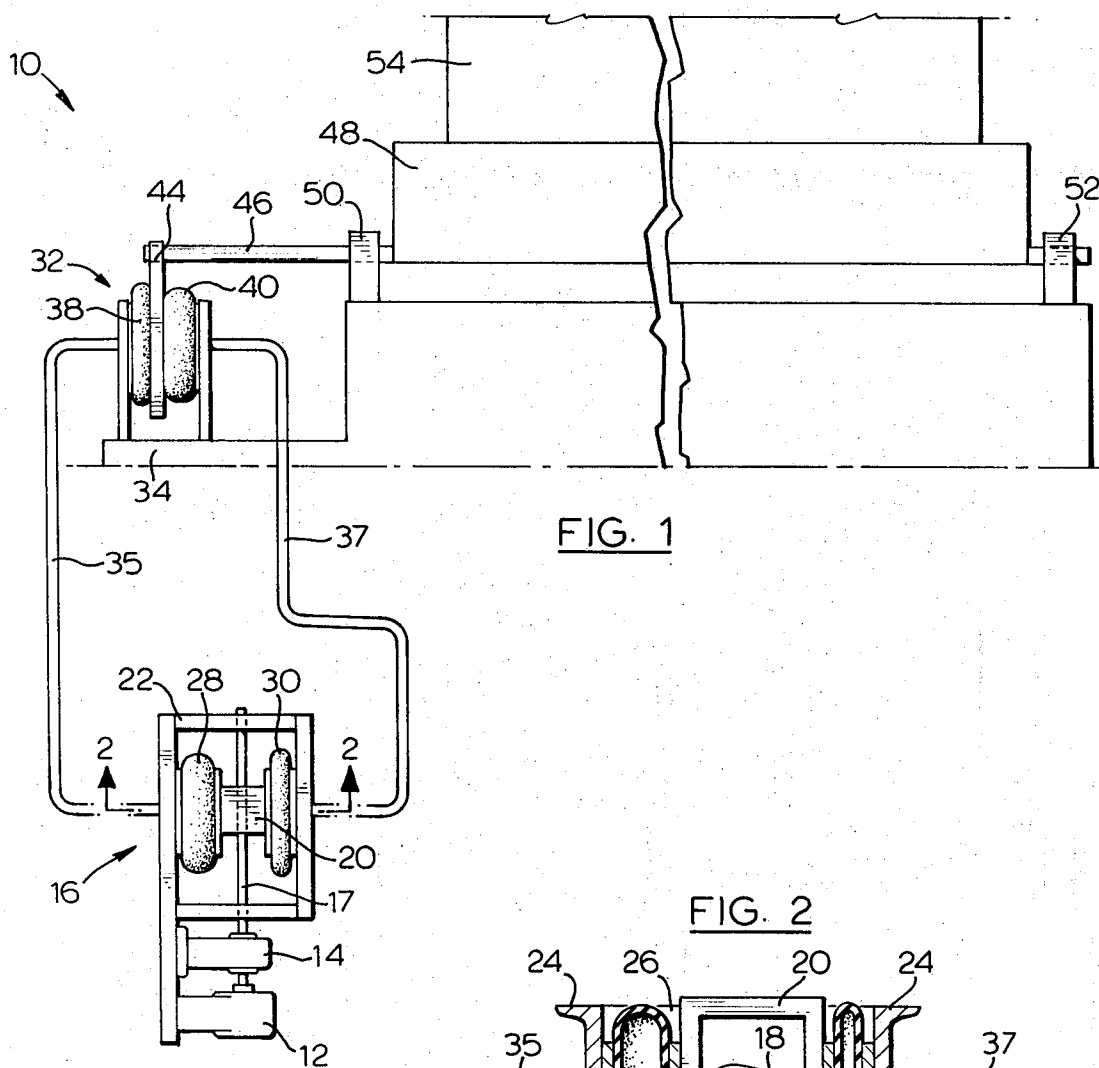


FIG. 1

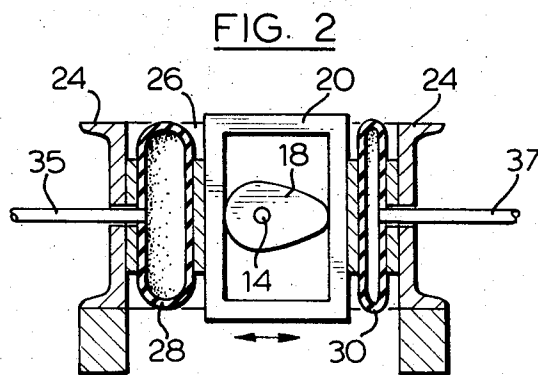


FIG. 2

OSCILLATOR SYSTEM FOR PAPER MACHINE

This invention is directed to an oscillator mechanism and in particular to a mechanical oscillator to reciprocate a relatively moveable component of a paper machine, such as a doctor.

The reciprocation of a doctor as used in a paper making machine, for purposes of cleaning a roll of the machine is presently effectual by an oscillating device comprising a pair of air bag actuators in mutually opposed relation, each connected to an air supply controlled by a reciprocating spool valve assembly. Such prior art arrangements suffer from the disadvantage that the control valve assembly is complex, and requires considerable maintenance.

The present invention provides an oscillator suitable for use in oscillating a machine component such as a doctor, comprising fluid displacer means, including a fluid displacing pump with a prime mover coupled thereto in driving relation, the pump having a pair of expansible chambers connected in mutually opposed relation to provide expansion of one chamber on contraction of the other chamber under the action of the prime mover; fluid actuator means having a pair of expansible chambers in mutually opposed expansive and contractive relation, mechanical output transmission means connecting the actuator means in displacing relation with the component to be driven, and fluid connection means connecting an output from each pump chamber to a corresponding chamber of the actuator means in substantially unrestricted flow transmitting relation therewith to provide oscillation of the component by the oscillator in response to oscillating movement of the pump by the prime mover.

It is generally contemplated that the system would be a hydraulic arrangement, relying on the presence of liquid in the respective pump and actuator, and using as prime mover an electric motor driving a cam shaft through a reduction gear to provide the desired rate of pump oscillation. The use of alternative prime movers such as air motors or hydraulic motors also is contemplated.

A particular advantage of the subject arrangement is that the driving motor and pump means can be located well clear of the immediate environment of the paper machine, which permits the use of a standard motor instead of a high cost totally enclosed motor that otherwise would be required. The only connection external to the paper machine, between the pump and the actuator, is a pair of small bore hydraulic connections, while the use of hydraulic power transmission permits the generation of adequate output force using relatively small actuator components.

The use of compressible bags as expansion-contraction elements in both the pump and the actuator provides low cost, low friction components of high dependability requiring no dynamic seals, and providing smooth movement of the doctor or other component being oscillated.

Certain embodiments of the invention are described, reference being made to the accompanying drawings wherein:

FIG. 1 is a schematic arrangement showing the relative arrangement of the system components, and FIG. 2 is section at 2—2 of FIG. 1.

Referring to the drawings, the fluid displacer device 10 comprises a prime mover, electric motor 12 and

gear box 14 connected in driving relation by shaft 17 with the pump means 16 by way of a rotary cam 18 and an oscillation frame 20. A rectangular frame 22 having end members 24 and sides 26 serves to sandwich a pair of deformable bags 28, 30 with the oscillation frame 20 enclosed therebetween.

The actuator 32 has a pair of bags 38, 40 mounted in a frame 34, the pump bag 28 being connected by line 35 with the actuator bag 38, and the other pump bag 30 being connected by line 37 with the other actuator bag 40.

The actuator 32 has a yoke 44 connected with the bags 28 and 30, for oscillation therewith, the yoke 44 being connected by an adjustable connecting rod 46 with the doctor 48.

The doctor blade 48 is mounted for sliding in supported relation in slideways 50, 52, so as to oscillate longitudinally with reference to the cylinder or drum 54 of the associated paper machine.

In operation, rotation of the motor 12 produces rotation of the output shaft 17 of gearbox 14. The shaft 17 is supported by journals (not shown) in the side members 26 of frame 22, for rotation of the cam 18. Rotation of the cam 18 produces transverse oscillation of the oscillation frame 20.

In the condition illustrated in FIG. 2, the bag 30 has been compressed by frame 20 to transfer the liquid therein into the line 37 so as to expand the actuator bag 40 connected therewith.

The expansion of the actuator bag 40 serves to displace the yoke 44, thereby making the doctor blade 48 move longitudinally relative to the drum 54 of the paper machine. Additionally, the expansion of the bag 40 serves to compress the bag 38, due to the longitudinal bag restraint provided by the actuator frame 34. This compression of bag 38 transfers liquid from the bag 38 into line 35, to cause filling of the pump bag 28 with liquid, preparatory to compression of the bag 28 on further rotation of the cam 18.

Variation in the effective volumes of the system components due to variation in temperature and expansion or contraction of the liquid may be compensated for by the provision of a suitable pressure accumulator in each of the lines 35, 37.

What I claim as new and desire by Letters Patent of the United States is:

1. An oscillating device to apply oscillation to a relatively moveable component of a paper machine, comprising a prime mover locatable remotely from the machine mechanically connected in driving relation with liquid pump means, said pump means being connected in liquid transfer relation with an oscillator means, said liquid pump means comprising a first compressible bag and a second compressible bag arranged in mutually opposed compressing relation within restraining frame means, said prime mover being arranged to provide alternate cyclic compression of said pump bags, said oscillator means comprising a third compressible bag and a fourth compressible bag arranged in mutually opposed compressing relation within restraining frame means, linkage means connecting said oscillator means to said machine component, said first bag being connected in liquid transfer relation solely with said third bag and said second bag being connected in liquid transfer relation solely with said fourth bag whereby in operation, on actuation of said prime mover to compress said first bag liquid is transferred therefrom to

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said third bag to cause expansion thereof, thereby moving said linkage means and said machine component, said expansion of said third bag compressing said fourth bag to transfer liquid to said second bag in expanding relation therewith.

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2. The device as claimed in claim 1 wherein said moveable component is a doctor blade transversely oscillatable in a cross-machine direction.

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