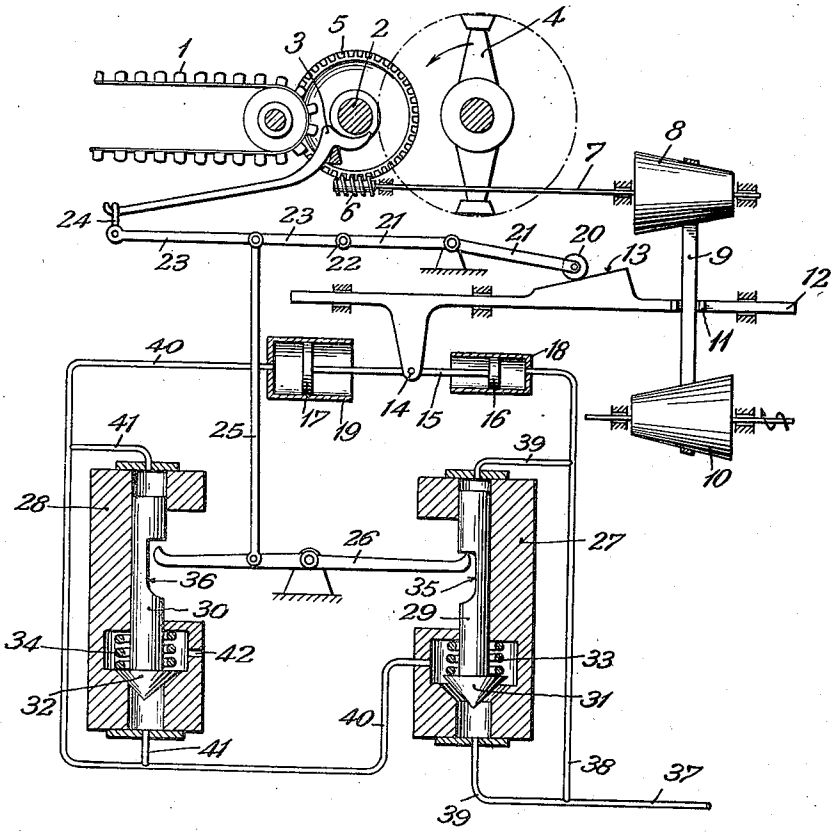
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DEVICE FOR REGULATING THE FEED TO MACHINES FOR TREATING FIBROUS MATERIAL

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DEVICE FOR REGULATING THE FEED TO MACHINES FOR TREATING FIBROUS MATERIAL

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This invention relates to devices for regulating the feed to machines for opening or cleaning cotton and like fibrous material, wherein the speed ratio of the drive of the feeding device is automatically adjusted in accordance with the thickness of the feed, that is, the fleece of material fed to the machine.

In contrast to the known apparatus for this purpose, according to the invention the speed ratio of the drive of the feeding device is varied as required by means of a control device operated by a liquid or gaseous medium instead of by directly controlled mechanical means.

In this way the numerous rigid elements for the motion transmission otherwise required and the drawbacks accruing therefrom can be avoided. The invention provides for accurately transmitting the variations in the thickness of the feed in a simple and readily responsive manner, so that the power consumption, the attendance and the wear are reduced to a minimum.

By means of a device which serves for carrying this method into effect and also forms part of the invention the valves of a pipe system for a liquid or gaseous medium are controlled by a feeler device in dependence upon the feed, so that pistons are accordingly displaced in associated cylinders for the purpose of influencing a variable speed gear.

In this arrangement, the cylinders and valves are exposed to full view at all times during the operation also and as these are simple mechanical elements there is no difficulty for anybody to understand their construction and to remedy their functioning if necessity should arise.

The method according to the invention is hereinafter described, by way of example, by taking reference to the accompanying drawing which illustrates partly in a schematic view and partly in section an exemplary device which serves for carrying the method into effect and also forms part of the invention.

The material to be opened is supplied in a manner known per se by an endless feed lattice (only partly shown) and is then engaged by a feed roller 2 cooperating with feed levers 3 constituting a feeler or gauging device, whereupon the projecting fiber portions are loosened by a beater 4. Feed roller 2 is rotated by a worm wheel 5 which is in mesh with a worm 6 on a worm shaft 7. An upper cone pulley 8 of a cone pulley drive is secured to driving shaft 7 and is connected with a lower cone pulley 10 of this drive by means of a belt 9 which latter pulley is driven by the machine by means of any suitable coupling.

The belt 9 is set into position by a belt shifting fork 11 in accordance with the adjustments of a setting member such as a belt shifter-rod 12. This rod 12 is provided with a wedge-shaped guide track 13 and a driving arm 14. This arm is connected with a piston rod 15 which is common to two pistons 16, 17 contained in cylinders 18, 19, respectively. The diameter of the bore of cylinder 19 is greater than that of cylinder 18, and the diameters of the pistons 17 and 16 are chosen accordingly. A roller 20 rides on the guide track 13 and is mounted on a two-armed presser or regulating lever 21. A pivot joint 22 joins this presser arm with a lever arm 23 the other end of which engages with a connecting piece 24 which is suspended by the feed levers 3 for free swinging movement.

The lever arm 23 is connected by a control rod 25 with a valve control lever 26 which cooperates with two valves. These valves are provided with casings 27, 28 respectively in which stems 29, 30 respectively are displaceably arranged which are provided with conical valve bodies 31, 32 respectively which cooperate with lower bores of the associated valve casings for a gaseous or liquid operating medium. The valve bodies 31, 32 are urged in the direction toward mating valve seats formed in these bores by springs 33, 34 respectively. The valve control lever 26 takes into recesses 35, 36 in the stems 29, 30 respectively by means of two terminal noses.

A conduit 37 is constantly under pressure of a gaseous or liquid operating medium. From this conduit 37 a conduit 38 branches off and leads to cylinder 18, whereas an upper and a lower branch pipe 39, 39 lead to the respective ends of valve casing 27 for equalizing the pressure acting on valve stem 29. A conduit 40 leads from the valve chamber of casing 27 into cylinder 19, whereas a lower and an upper branch pipe 41, 41 lead from this conduit into valve casing 28 for equalizing the pressure acting on valve stem 30. A passage 42 leads out of valve chamber 28 to the atmosphere.

If during the operation fluctuations in the thickness of the feed supplied by the feed lattice conveyor 1 should arise so that, for example, the thickness of the feed is decreased, the layer passing between feed roller 2 and the feed levers 3 varies accordingly, that is, the thickness of this layer is decreased in this event.

Consequently, the outer arms of the feed levers

3 rock downwardly, so that the adjoining left end of arm 23 is lowered by the latter arm rocking about joint 22, which remains at first in unchanged position, and consequently the control rod 25 is lowered. By this means, valve control lever 26 is accordingly rocked, thereby raising valve stem 29 by means of the right hand end of this lever, so that valve body 31 is lifted off its seat, whereupon the pressure of the operating medium spreads through pipe 39 to conduit 40 via this valve and is thus transmitted to cylinder 19. In consequence thereof, piston 17 is at first displaced to the right in this cylinder, and the shifting fork 12 is moved together with it by means of piston rod 15 and operating arm 14, while the resistance set up in cylinder 18, having the smaller bore the working portion of which is subjected to the pressure of the pressure conduit, is overcome.

In this arrangement, the belt shifting fork 11 shifts the belt 9 on the cone pulleys 8, 10 to the right, whereby the driving speed of shaft 7 is increased, so that the advance movement of the feed entering between the feed roller 2 and the feed levers is increased by action of this feed roller, thereby producing equalization. During said displacement of the belt shifter-rod 12 roller 20 descends on the wedge-shaped guide track 13, in consequence of which, the two-armed presser lever 21 is accordingly rocked and the pivot joint 22 is raised. The outer end of the associated arm 23 rocks together with the connecting piece 24 about the then immovable fulcrum afforded by the feed levers 3, so that valve control lever 26 is accordingly rocked by means of control rod 25, valve 29, 31 drops back into closed position by action of spring 33, and branch pipe 39, that is, the pressure conduit, is shut off. Thereupon, again a stable phase of operation sets in.

If, reversely, the feed supplied by the feed conveyor 1 increases the outer arms of the feed levers 3 are raised, so that valve 30, 32 is opened by means of lever arm 23, control rod 25, and valve control lever 26. The operating medium then discharges from cylinder 19 through conduit 40, lower branch pipe 41, the valve chamber of casing 28, and passage 42 into the open. Due to the pressure surge then produced in cylinder 18 relatively to cylinder 19, belt shifter-rod 12 is displaced in the opposite direction than before, whereby the driving speed of shaft 7 is reduced. During this displacement of belt shifter-rod 12 roller 20 is raised by means of the wedge-shaped guide track 13, so that presser lever 21 is correspondingly rocked and pivot joint 22 is forced downwardly, in consequence of which, valve control lever 26 is rocked back by means of arm 23 and the then downwardly moving control rod 25, and valve 30, 32 is returned into closed position by action of spring 34.

Instead of a cone pulley drive a step pulley drive may be used. Furthermore, the additional energy required for varying the speed ratio may be supplied by an electric motor the drive gearing of which is accordingly controllable.

Various changes and modifications may be made in the practice of my invention without departing from the principle thereof, by adding customary practice and established knowledge of the art to the present disclosure and the scope of the appended claims is not to be regarded as limited except as specified therein.

I claim:

1. In a device for regulating the feed to machines, as openers and cleaners, for cotton and like fibrous material, a feeding device for advancing the feed to the machine, a feeler device comprising feed levers cooperating with the advancing feed in accordance with the variations in the thickness thereof, a pipe system for a pressure medium, two valves included in said system, a leverage intercalated between said valves and said feeler device for controlling the flow of said medium through said system in accordance with said variations, two cylinders containing displaceable pistons, included in said system for said medium to cooperate with said pistons, one of said cylinders being put under pressure by means of said leverage for discharging a certain amount of said pressure medium therefrom through one of said valves, when the thickness of feed increases, and a variable speed gear influenced by said pistons for decelerating the advance movement of said feeding device in accordance with said amount of pressure medium discharged by said valve.

2. In a device for regulating the feed to machines, as openers and cleaners, for cotton and like fibrous material, a feeding device for advancing the feed to the machine, a feeler device comprising feed levers cooperating with the advancing feed in accordance with the variations in the thickness thereof, a pipe system for a pressure medium, two valves included in said system, a leverage intercalated between said valves, and said feeler device, two cylinders of different size bores, containing commonly displaceable pistons, included in said system for said medium to cooperate with said pistons, the cylinder of larger bore being put under pressure by means of said leverage by action of the smaller piston on the larger piston for discharging a certain amount of said pressure medium from said cylinder of larger bore, through one of said valves when the thickness of feed increases, and a variable speed gear influenced by said pistons for decelerating the advance movement of said feeding device in accordance with the common displacement of said two pistons.

3. In a device for regulating the feed to machines, as openers and cleaners, for cotton and like fibrous material, a feeding device for advancing the feed to the machine, a feeler device comprising feed levers cooperating with the advancing feed in accordance with the variations in the thickness thereof, a pipe system for a pressure medium, two valves included in said system, a leverage, comprising a regulating lever, intercalated between said valves and said feeler device, two cylinders, containing displaceable pistons, included in said system for said medium to cooperate with said pistons, one of said cylinders being put under pressure by means of said leverage for discharging a certain amount of said pressure medium therefrom through one of said valves, when the thickness of feed increases, and a variable speed gear, including a setting member and a guide track both shifting together with said pistons, and the latter influencing said regulating lever, for decelerating the advance movement of said feeding device and initiating the return movement of said discharge valve through said regulating lever by means of said setting member.

4. A regulator for regulating the drive of feeding devices for supplying fibrous material at a uniform rate to a machine for opening same, comprising means for feeding a continuous layer of material toward the opening machine, drive

means for said feeding means having speed varying means, means for continuously measuring the quantity of material being fed by gauging the thickness of said layer, a source of fluid under pressure, motor means having pistons provided respectively with oppositely acting piston faces, means connecting said piston faces together so as to mutually influence each other, means connecting said piston means with the speed varying means of the drive means, the actuating influence of one of said pistons on the drive means being greater than that of the other, valve means for controlling communication between said one piston and the pressure fluid supply source and with the atmosphere, said other piston being constantly connected with said pressure source, and means connecting the gauging means with the valve means to control actuation of said piston means to adjust said driving means in accordance with the thickness of said layer of material to increase the speed of drive when the layer is thinner and to decrease said speed when the layer is thicker.

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