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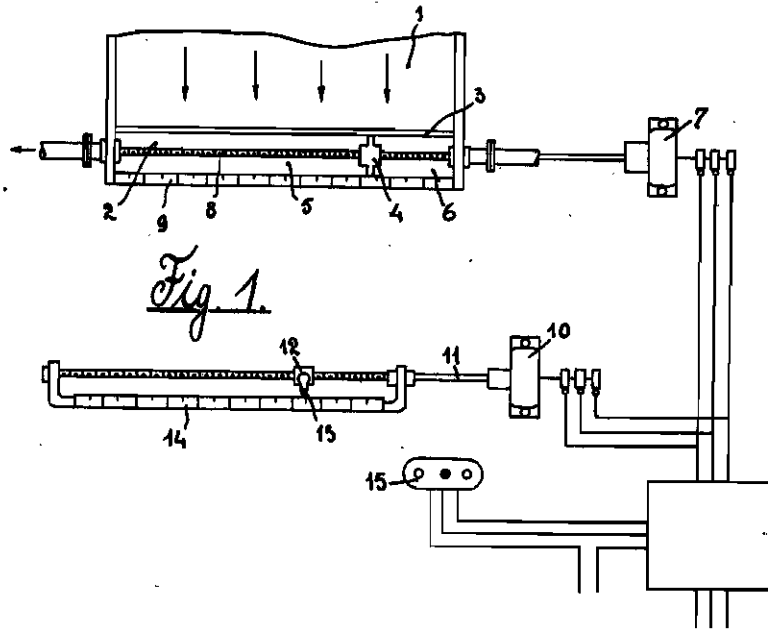
H. PALM

CONTROL OF PAPER-MAKING MACHINERY

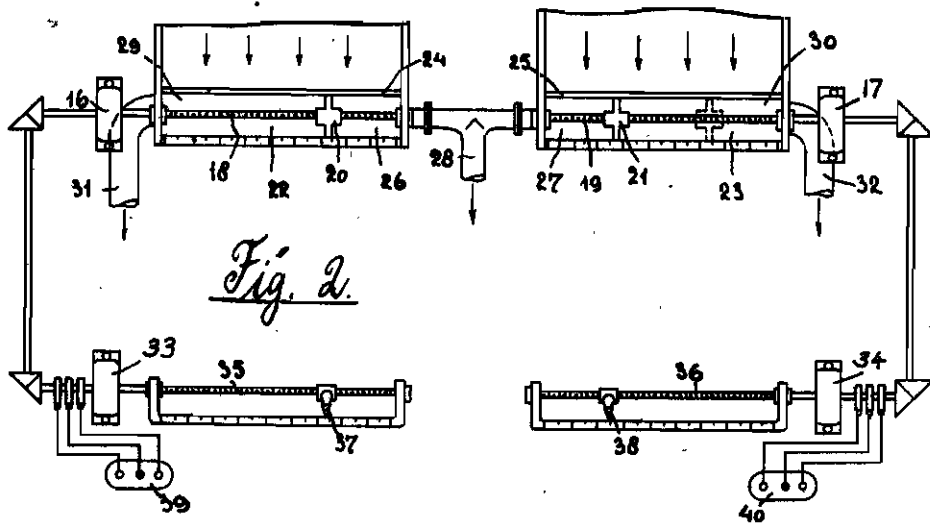
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*Fig. 1.*



*Fig. 2.*

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# ALIEN PROPERTY CUSTODIAN

## CONTROL OF PAPER-MAKING MACHINERY

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the Alien Property Custodian

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My invention relates to means for controlling and regulating the pulp feed to paper-making machines, to mixing vats etc. It is an object of my invention to provide means for controlling and regulating the flow of the pulp fed into the machine, the vat or the like in a particularly simple and efficient manner.

I am aware that it is old to regulate the quantity of pulp fed to the machine by causing the pulp to pass an overflow arranged in front of a channel in which is arranged a separating slide for lateral displacement. The pulp entering the channel on one side of the slide is conducted to the machine, while the pulp entering the part of the channel on the other side of the slide is returned into the mixing vat. Obviously the position of the separating slide is responsible for the quantity of pulp fed to the machine.

In the practical operation of this device it has been found that it enables the pulp feed to be controlled and regulated in a very exact manner, which also allows creating absolutely uniform conditions of operation for the repeated production of paper of exactly the same weight by merely adjusting the separating slide. This possibility is due to the fact that the quantity of pulp required in the production of paper of a predetermined weight is exactly proportional to the division of the channel by the slide. No such simple relation to the quantity of pulp supplied exists with ordinary valves, throttles and the like, which are operated by a motor by way of remote control and are coupled with registration instruments, apart from the fact, that any throttling action gives rise to eddies which further influence the distribution of the pulp in an unfavorable manner. Furthermore the quality of the pulp, as compared with water, also influences the quantity of pulp passing through, and the viscosity of the pulp further influences the inner friction and wall friction to the extent of causing variations of the quantity of pulp issuing through the valves or throttles, while all these properties of the pulp have no influence on the distribution by means of a separating slide.

Owing to this circumstance the position of the slide clearly determines the distribution of the pulp about to enter the paper-making machine. I am thereby enabled to provide means for a remote control of the slide by means of a motor which can be operated from one or a plurality of stations remote from the machine, an indicating device at each station resembling the slide arrangement being arranged at each station and allowing the position of the slide in the channel to be ascertained and controlled in the simplest possible manner.

Obviously I am also enabled to couple the slide with means for controlling other conditions of operation of the paper-making machine, for in-

stance the quantity of diluting water, the machine speed, the drying steam etc., which may be subjected to different variations, which may be carried out individually by hand. In these cases the simplicity of the slide control offers the possibility of locating the means for controlling other conditions at the control stations for the slide and to couple them in such manner that the change in the operations of the machine can be brought about quickly in a predetermined manner.

In the drawing affixed to the specification and forming part thereof two embodiments of my invention are illustrated by way of example in a purely diagrammatic manner.

In the drawing:

Fig. 1 is a diagram illustrating the feed channel and separating slide in combination with means enabling the slide to be adjusted by remote control.

Fig. 2 is a similar showing of an arrangement of two such controlling devices combined with remote control stations.

Referring to the drawing and first to Fig. 1, 1 is a pulp feed supply of considerable width and 2 is the separating channel extending in front of and below the pulp supply, being separated therefrom by the overflow 3. 4 is the separating slide extending across the channel 2 and subdividing it into two parts 5 and 6. From the part 5 of the channel the pulp flows to the paper-making machine, from the part 6 back to the mixing vat.

7 is an electro-motor operatively connected with and displacing the slide 4 by turning a screw spindle 8, on which the slide 4 is mounted. 9 is a scale allowing to read the position of the slide at any individual moment. 10 is another electro-motor electrically connected with the motor 7 for synchronous motion. The motor 10 is located at a remote control station and drives a screw spindle 11 carrying a slide 12 with the pointer 13 extending above a scale 14. 15 is a push-button switch for starting and reversing the motors.

Obviously the position of the slide 4 in the channel 2 can be read at any time on the scale 14 of the control station and the slide 4 can be shifted by operating the switch 15.

Instead of an electrical connection a hydraulic connection may be provided between the motors for synchronous operation, and in certain cases even a mechanical coupling such as for instance a flexible shaft might transmit power from one spindle to the other. The scale 14 at the control station may differ from the scale 9 and in that case a step-up or step-down gearing may be provided for the pointer drive at the control station, for instance the spindle 11 may be threaded for a different pitch.

Fig. 2 illustrates a modified form of an arrangement embodying this invention, in which a pulp container can be disconnected and another pulp container connected to the pulp feed, as for instance in the case where during the production of the paper the color shall be changed, as will be the case with several small orders for the same kind of paper in different colors. In that case the pulp is fed to the paper-making machine first from one and thereafter from another container.

In that case two devices such as shown in Fig. 1 are provided, one for each container. Here the slide adjusting motors 16, 17 act by means of spindles 18, 19 on the two slides 20, 21 mounted for displacement in the channels 22, 23 arranged in front of the overflows 24, 25 respectively. The pulp from the parts 26, 27 of the channels passes through a common feed tube 28 to the paper-making machine, while the pulp from the parts 29 and 30 is fed through tubes 31, 32 respectively to two separate mixing vats.

With the motors 16, 17 are connected controlling motors 33 and 34 respectively, both mounted at a control station and driving in synchronism with the motors 16, 17 by means of spindles 35, 36 the pointers 37, 38 which indicate the position of the slides 20 and 21 respectively. Press-button switches 39, 40 are provided to start and reverse the motors. These switches may either be actuated separately or may be coupled with each other.

This arrangement allows gradually cutting out one and cutting in the other mixing vat or pulp container by shifting for instance slide 21 into the position shown in dotted lines, while at the same time the slide 20 is shifted in the opposite direction to cut in the other container. By thus operating the device the total quantity of pulp fed to the paper-making machine remains the same throughout and the attendant may concentrate himself onto the changing of the colors.

Similarly different kinds of pulp, for instance wood pulp and cellulose pulp may be fed from two separate containers in an exactly predetermined proportion to a mixing vat and the proportions may again be controlled and regulated from a remote control station. In accordance with the particular purpose in view such a device may be arranged in different manners. It may for instance resemble the arrangement illustrated in Fig. 2, being however operated in such manner that the two feed devices, instead of being operated alternatively, are made to operate simultaneously, feeding the different kinds of pulp in predetermined proportion.

The motors 16 or 17 and 17 may be fitted with circuit breakers which, if they are coupled with each other, also act on both motors and automatically determine the correct position of the newly started regulating device by cutting out its motor. After separation of the circuit breakers the motor may also be connected independently, the slide 20 (or 21) being shifted into a different position, for instance if the change of color is connected with the change in the weight of the paper or in the speed of the engine.

The two motors 16 and 17 may also be replaced by a single motor which should preferably be arranged between the two controlling devices and in that case drives both spindles 18 and 19. If one of the two controlling devices shall be operated separately, each spindle may be disconnected by itself. Together with the disconnec-

tion of the spindle the motor 33 or 34 controlling the respective device is stopped or, if only a single control motor should be provided at the remote control station, the spindle 35 or 36 is disconnected separately. In that case the couplings connecting the control devices are also under remote control, for instance by electromagnetic means.

A similar controlling and regulating device, which is also operated from the same remote control station, may also be provided for supplying diluting water to the pulp. Similarly the remote control devices for other operations of the paper-making machine, including the operating speed, the quantity of drying steam for the drying cylinders etc. may be combined at the same remote control station. It is further possible to couple the switches provided at the remote control station for certain cases in which the operation of the machine shall be changed. Thus, for instance, if in the production of a certain kind of paper the weight and all other properties shall remain unchanged, but the operating speed shall be raised, obviously all other factors must rise in the same proportion and in accordance to the rise in the production per unit of time also a greater quantity of pulp and diluting water must be supplied. Similarly more steam or current must be supplied to the power engines and more steam to the drying cylinders. On the other hand, if for instance with the same operating speed the weight of the paper produced shall be increased, the operation of the power engine remains unchanged, however the quantities of pulp, water and drying steam must be raised in even proportion. By coupling the corresponding switches at the remote control station these transitions from one to the other mode of operation are greatly expedited and facilitated and much time is saved. At the same time a saving in pulp is obtained since the waste otherwise produced in the interval is greatly reduced.

If the rise or drop of the different operations shall not occur in exactly uniform proportion, for instance if at uniform speed and a rise in the weight of the paper a more concentrated pulp shall be supplied and the quantity of diluting water reduced correspondingly, this can easily be effected by setting the circuit breaker for the diluting water from the beginning on that point of the corresponding scale which corresponds to the desired quantity of water, while the slide governing the supply of pulp is adjusted for a greater supply. In this example the same applies to the regulation of the quantity of drying steam if this quantity shall be reduced. If adjustable circuit breakers are provided for all operations of the machine, previous adjustment of the circuit breakers to the respective points on their scales will suffice to exactly predetermine the new conditions of operating the paper-making machine. If a separate motor is provided for each operation, the circuit breaker apportioned to it will act on it and if several controlling and regulating devices are driven by a common motor, the circuit breakers of two or all these devices will act on the respective coupling.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.