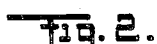


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STUFF TREATMENT APPARATUS

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2 Claims. (Cl. 137—153)

The present invention relates to an improve-
ment in feed pressure control apparatus for treat-
ment machines wherein the stock is admitted
under pressure and passed in fluid form or in a
fluid medium through a treatment zone and
there subjected to the desired or necessary forces.

One object among others of my invention, has
been to provide apparatus whereby the pressure
and amount of the material fed to a machine
having a constant or regulatable throughput may
be automatically controlled and maintained
within practical limits of variation.

One embodiment of my invention in a form
acceptable for use in connection with the treat-
ment or preparation of paper stock or the like is
illustrated in the accompanying drawing attached
to and forming a part of the present specifica-
tion and in which—

Figure 1 is a diagram illustrating a form of
feed pressure control as applied to a suitable mill
or other machine for treating the material; and

Figure 2, a detail in section showing a form of
return control or pressure relief valve adapted
for use with the apparatus shown in Figure 1.

For effective operation, apparatus of the kind
to which this invention is applicable is preferably
supplied by feeding mechanism capable of deliver-
ing material for treatment at a substantially con-
stant pressure and adjustable to feed the mate-
rial at different substantially constant pressures
within a suitably wide range. These controls
more particularly affect the capacity or rate of
throughput of the treatment machines, altho they
may also under favorable circumstances be uti-
lized in connection with control over the quality
and/or extent of treatment in the machine. So
far as the feed pressure is adjustable over a wide
range, the capacity of the treatment machine is
widely flexible and capable of satisfying different
volume demands; and so far as the controls main-
tain a given pressure substantially constant, the
capacity or throughput remains substantially uni-
form. In the defibering, refining, finishing, fibril-
lation or hydration of wood pulp, for example,
these features are especially important, both in
actual production and in their relation to economy
in plant equipment.

As shown in the drawing, stock is fed to suit-
able treating apparatus, here shown as a mill A
having a feed inlet opening 26 which admits
stuff to the feed chamber 23 from a supply chest
201 through a stock supply conduit 151 by means
of a suitable pump 152. An outlet conduit 27 dis-
charges treated stock from a discharge chamber
24. A gauge 153 registers pressure in said con-

duit which includes a T section 160 having one
outlet opening toward the mill, or other appa-
ratus, and another toward a return or relief con-
duit 155 positioned to discharge excess stuff into
said chest 201.

For automatically regulating the feed pressure
of the material fed to mill A, a partition or wall
across one arm of said T section 160 provides
an opening or relief port 161, Figure 2, into the
stock return conduit 155. In a preferred embodi-
ment, said opening is made in a wall in effect
continuous with the conduit wall and is square
in shape. A suitable valve gate 162 movable across
said opening is actuated by a piston 163 having a
head 164 mounted in cylinder 165. An opening
166 admits fluid under pressure into said cylinder
at one side of said head and another opening 167
admits fluid under pressure at the other side
thereof. In the device shown, the valve including
gate 162 produces an effective area of the opening
161 which varies as the square of the extent of
gate movement, thus adapting the construction
for efficient operation when handling both large
and small quantities of by-passed stock and for
most effectively handling stock varying in con-
sistency.

To actuate or produce feed controlling move-
ment of said gate 162, a supply of fluid under
pressure is admitted to the cylinder through open-
ing 166 by a pipe 168 and through opening 167
by a pipe 169, the direction of flow or pressure
through said pipes being controlled by pilot valve
170 having a waste vent 171 and a supply inlet
pipe 172. The neutral position of the ports in
pilot valve 170 is determined by the position of a
balance beam 173 pivoted at 174 and having a
slidable weight 175. A fulcrum 176 is arranged
with one end engaging the underside of beam 173
and the other end resting on the diaphragm 177
extending across a chamber 178 which is con-
nected by a feeler pipe 179 directly to the feed
pressure chamber 23 of mill A. A needle valve
180 admits a suitable supply of water to said feeler
pipe 179 from the water main 181 in such volume
and at such pressure as to maintain said pipe con-
stantly full of water from said main at substan-
tially all operating pressures in the feed chamber.
Thus a moving and constantly renewed head of
water in line 179 operates in effect as a flexible
link or connecting element through which pres-
sure changes in the feed chamber are transmitted
to the diaphragm 177. Under these circum-
stances, the material in the feed chamber is pre-
vented from backing or pushing up into the open
end of pipe 179.

In operation, the position of weight 175 along beam 173 will be set to maintain any desired feed pressure in feed chamber 23, indicated for example by a gauge 153. If the feed pressure rises, the increase is transmitted through the water supply in line 179 to diaphragm 177 which moves up and in so doing raises the free end of beam 173. It will be understood that the volume and pressure of water normally supplied in said line 179 are such that no material passes into said line from feed chamber 23, thus preventing clogging in said line by paper pulp or other stuff in said feed chamber. A link or stem 183 connects said beam with the moving part of pilot valve 170 so that when beam 173 moves upwardly supply water under pressure is admitted through a port of valve 170 to pipe 168 which raises gate 162, thus allowing a sufficient amount of stock to by-pass through opening 161 to restore the balance between the weighted beam and the feed pressure. If the feed pressure falls below the balanced value, adjustment in the opposite sense is effected. With the arrangement above described any predetermined suitable feed box pressure may be automatically and positively maintained within a satisfactory range of variation. The extent of movement of the free end of beam 173 may be limited by adjustable stops 184 and 185. A pin 186 projects from the beam laterally and in position to be engaged with a cam action by a curved portion of one arm 187 of a lever pivoted at 188, the other arm 189 being provided with a weight which in one position locks the beam out of operation, and in the other permits the beam to move freely between the stops 184 and 185.

From the foregoing description and stated mode of operation of one form of apparatus embodying my invention, it appears that the feed control so provided is automatic and positive.

Furthermore, the system may also be hand controlled by closing valve 200 and manually regulating the effective opening of valve 180.

Although shown in connection with a mill of the colloid type, i. e., wherein material is treated by film shearing, it is contemplated that my control apparatus may be effectively applied to control feed pressure in the operation of other kinds of material treating or handling devices wherein, for example, solid material in solution, mixture, or suspension in a fluid is fed thereto under pressure.

I claim:

1. Feed pressure control apparatus for a conduit adapted to feed paper pulp or the like which includes in combination a diaphragm, a feeler pipe having one end opening at one side of said diaphragm and the other end opening into said conduit for transmitting static pressure in the conduit to said diaphragm, a source of water pressure independent of pressure in the conduit and a water supply pipe connected to admit a controlled volume of water from said independent source to said feeler pipe between said end openings.

2. Feed pressure control apparatus for a conduit adapted to feed paper pulp or the like which includes in combination a diaphragm, a feeler pipe having one end opening at one side of said diaphragm and the other end opening into said conduit for transmitting static pressure in the conduit to said diaphragm, a source of water pressure independent of pressure in the conduit, and means for controllably delivering into said feeler pipe a supply of water from said independent source to act as a moving and renewable static pressure transmitting element between said diaphragm and material under pressure in said conduit.

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