

W. H. MILLSPAUGH.
 SUCTION BOX VACUUM REGULATOR FOR PAPER MACHINES.
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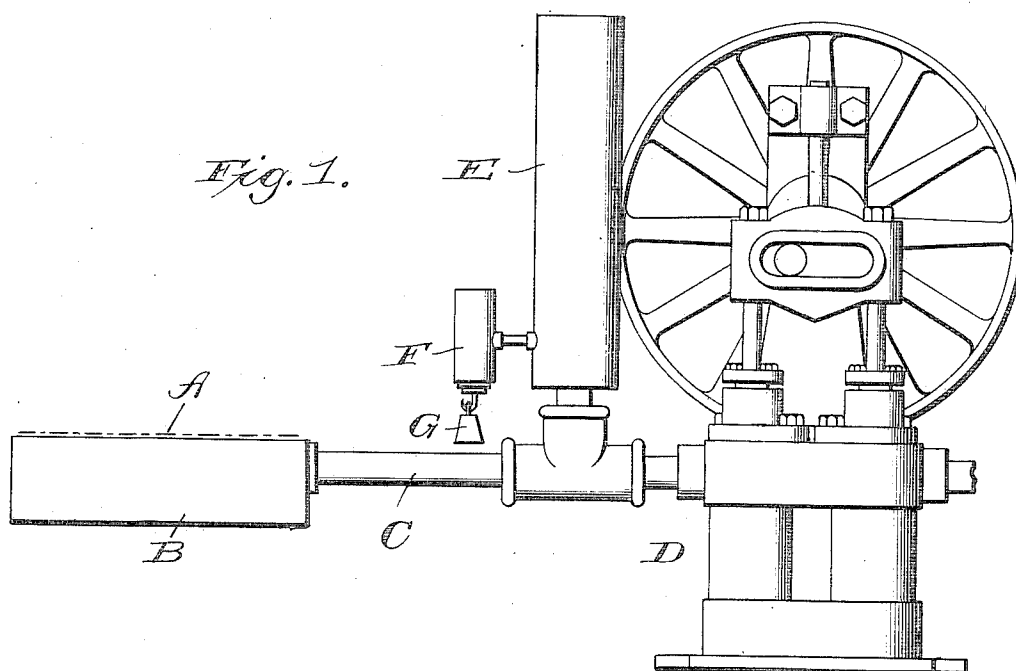
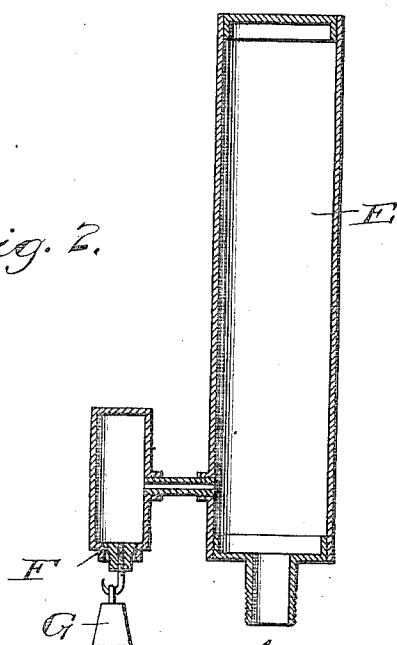


Fig. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM H. MILLSPAUGH, OF SANDUSKY, OHIO, ASSIGNOR TO THE SANDUSKY
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SUCTION-BOX VACUUM-REGULATOR FOR PAPER-MACHINES.

971,298.

Specification of Letters Patent. Patented Sept. 27, 1910.

Application filed October 27, 1905. Serial No. 284,655.

To all whom it may concern:

Be it known that I, WILLIAM H. MILLS-
PAUGH, a citizen of the United States, resid-
ing at Sandusky, in the county of Erie and
5 State of Ohio, have invented certain new
and useful Improvements in Suction-Box
Vacuum-Regulators for Paper-Machines;
and I do hereby declare the following to be
a full, clear, and exact description of the in-
10 vention, such as will enable others skilled
in the art to which it appertains to make
and use the same.

In paper-making machines of the "Four-
drinier" type, as well as the so-called "cyl-
15 inder" machines, the paper pulp while
forming on the wire or mold, or while on
the felt, is passed over a suction-box or
vacuum-chamber, for extracting water and
moisture from the pulp. It is important to
20 maintain a uniform vacuum in the suction-
box, in order to exert at all times an even
pull on the wire or felt, and also to accu-
rately govern the amount of the vacuum.
The present invention accomplishes these
25 objects by simple and efficient means.

In the accompanying drawings, which
form a part of this specification: Figure
1 represents in elevation a suction-box with
pump and equalizing apparatus embodying
30 my invention. Fig. 2 is a central vertical
section of the equalizing tank and its regu-
lating valve.

A represents in cross-section the wire web
or felt which carries the paper pulp over
35 the suction-box B, for extracting the water
and moisture from the pulp. A suction-
pipe C leads from the suction-box to a pump
D. Operation of the pump creates the so-
called vacuum in the suction-box, and
40 pumps out the air and water, discharging
the same into the open.

Between the suction-box and pump, the
pipe C is in communication with a relatively
large tank E, placed above the line of said
45 pipe and virtually forming an enlarged
part or chamber of the suction-pipe. The
function of this tank is to equalize the
vacuum and thus maintain an even pull on
the wire or felt. To illustrate, in this class
50 of machinery the vacuum for extraction of
moisture is usually and preferably attained
by means of a positive reciprocating power
pump, connected by a pipe line with the
suction-box, as illustrated herein. Now the

motion of the pistons being faster at the 55
middle of the stroke than at the ends, ceas-
ing in fact at the ends of the stroke, there
results an unequal vacuum or suction, with
consequent unequal removal of water, and
tendency to lock the wire or felt on the sur- 60
face of the suction-box, frequently causing
damage and also wearing the surface of the
suction-box and shortening the life of the
wires and felts. Without the tank E, the
vacuum gage is seen to fluctuate from prac- 65
tically nothing to the maximum attained at
the middle of the stroke. But with this ap-
paratus, the tank E equalizes the suction.
It stores vacuum so to speak during the
middle of the stroke for the needs of the ma- 70
chine at the ends of the stroke and the
vacuum gage shows a uniform and constant
vacuum. This insures at all times an even
pull on the wire or felt and eliminates the
evils of unequal suction entirely, prolong- 75
ing the life of wires, felts and suction-box
covers, and uniformly extracting the mois-
ture from the paper stock. Said equalizing
tank E has a regulating valve F, whose
office is to govern the amount of the vacuum. 80
It is a simple valve opening inward, and
held normally closed or against its seat by
a weight G or other pressure, but adapted
to open when an excess vacuum occurs with-
in the suction line or tank, such as to cause 85
the outside atmospheric pressure to over-
come the weight. For example, if the ma-
chine is equipped with a large vacuum
pump, and the sheet of paper should sud-
denly become heavier, an excess vacuum 90
would be instantly created in the suction-
box, locking the wire thereof and causing
damage. But with this apparatus the vacu-
um cannot exceed a certain amount, which
may be predetermined by the weight, be- 95
cause air is admitted from the outside and
breaks the excess vacuum.

The equalizing tank E is preferably a gal-
vanized steel cylinder having closed heads
with a nipple at one end for attachment to 100
and communication with the suction-pipe;
and the valve F is shown operating in a
little chamber attached to and connected to
the tank by a short pipe-section.

Paper manufacturers have long suffered 105
from unequal vacuum in suction-boxes, and
to obviate the same have used expensive
triplex pumps, which are an improvement

over single or duplex pumps, but do not fully equalize the pull. With the present apparatus, however, a perfectly even pull is at all times exerted on the wire, even with the
5 use of single cylinder pumps, resulting in a uniformly dry sheet and a tendency to increase the life of the wires.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent of the United
10 States is:

1. The combination, with the suction-box of a paper-machine, and its vacuum-pump connected therewith, of a closed tank or reservoir in constant communication with the
15 suction line or conduit between the suction-box and pump, said tank having an opening and an inwardly-opening regulating valve held to close the same by the pressure in said

tank together with an additional pressure 20 less than that of the atmosphere.

2. A suction-box vacuum-regulator comprising a closed tank having means for connection to the suction-line of a suction-box of a paper-machine and having a valve-controlled opening with a weighted or equivalently-actuated valve held seated against the same and adapted for inwardly-opening under atmospheric pressure when the vacuum
25 in said tank exceeds a predetermined 30 amount.

In testimony whereof I affix my signature, in presence of two witnesses.

WILLIAM H. MILLSPAUGH.

Witnesses:

CHAS. MOORE,
J. R. GALLOWAY.