

(No Model.)

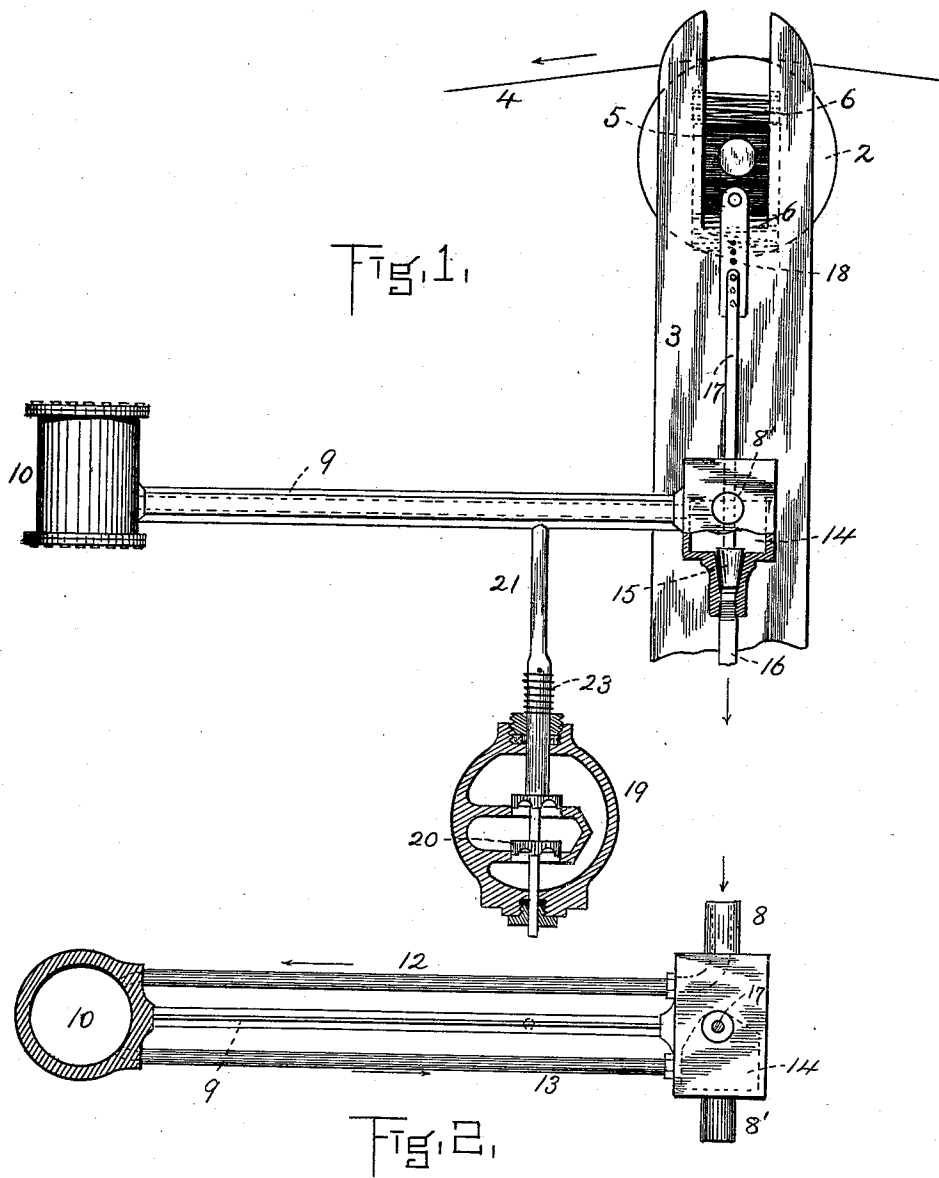
2 Sheets—Sheet 1.

R. SMITH.

STEAM REGULATOR FOR PAPER MACHINES.

No. 508,993.

Patented Nov. 21, 1893.



Witnesses.
Francis C. Stanwood
Richard H. Lodge

Inventor.
Richard Smith.
by H. C. Lodge Atty.

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2 Sheets—Sheet 2.

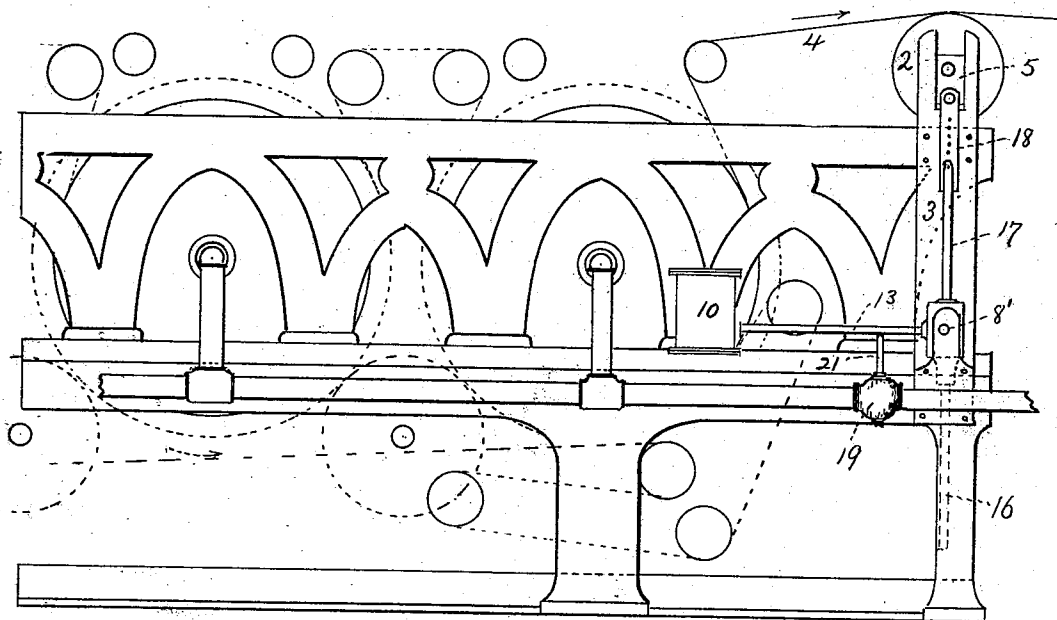
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Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

RICHARD SMITH, OF SHERBROOKE, CANADA.

STEAM-REGULATOR FOR PAPER-MACHINES.

SPECIFICATION forming part of Letters Patent No. 508,993, dated November 21, 1893.

Application filed June 3, 1892. Serial No. 435,432. (No model.)

To all whom it may concern:

Be it known that I, RICHARD SMITH, a citizen of the Dominion of Canada, residing at Sherbrooke, in the county of Sherbrooke and Province of Quebec, Canada, have invented certain new and useful Improvements in Steam-Regulators for Paper-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to apparatus employed on paper machines for regulating the supply of steam necessary to suitably dry the paper-web, which is continuously traveling over the machine. Furthermore it consists in the arrangement of mechanism, whereby the tension of the paper-web is used to control the supply of steam. When the paper becomes dry, the tension increases and the supply of steam is to be reduced, while as the paper becomes moist and the tension diminishes the steam supply is to be increased.

My present invention consists in improvements on the above class of apparatus, whereby the mechanism is very much simplified, and the apparatus is rendered much less liable to get out of order. The gist of this invention is embodied in a liquid-weighted lever, in connection with a liquid-valve controlled by the continuously traveling paper-web to increase or diminish the weight of liquid in the lever, and thereby actuate the steam-valve in accordance with the necessities of the paper in process.

The drawings represent in Figure 1, a sectional elevation of a steam-regulator embodying my invention. Fig. 2 is a plan of the same, the spring roll, housings and journal-supports of the lever being omitted. Fig. 3, represents two drying cylinders and frame in part of a paper-making machine having my steam regulator in position.

In said drawings 2 represents a spring-actuated roll, mounted in twin housings or vertical posts 3, only one of which is shown as necessary for descriptive purposes, while

a continuously traveling paper-web 4, which runs lengthwise of the paper-machine (not shown) bears upon said roll, as illustrated in Fig. 1. The journal boxes 5 are secured in guides in the posts 3 and are supported by springs 6.

Laterally of one of the housings is journaled a pivotal valve-case 7 fitted with trunnions 8 8', the former of which is preferably tubular, as shown, for liquid supply. Extending from this valve-case is a lever-arm 9; while supply and discharge pipes 12, 13, respectively connect therewith. The pipe 12 connects with the trunnion 8 to some suitable liquid supply. The pipe 13 terminates in a discharge chamber 14 in the valve-case, said chamber being fitted with a valve 15 situated at the mouth of the main discharge pipe 16. Vertically from this valve rises a valve-rod 17 which is adjustably united to a plate 18, pivotally secured to the journal-box 5 of the roll 2.

From the description of the above parts, it will be seen that variation in the tension of the paper-web 4 is dependent upon the amount of moisture in said paper and reciprocations of the valve 15 are caused thereby. Thus by opening or closing the said valve, the liquid contents in the receptacle will be increased or diminished and attendant movement of the lever arm will be produced. In connection with this lever arm 9 I have shown the steam valve case at 19 and its valve at 20, which controls the steam supply to the apparatus for drying the paper-web in process. This valve is preferably a balance valve and is spring-actuated in order to retain it normally open, as shown in Fig. 1. The upper end of the valve-stem 21 contacts against the lever-arm, and by this means the continuously moving paper-web automatically regulates the supply of steam, which is requisite for the proper drying of said web. In the present instance I have shown the liquid weighted vessel in constant communication with the supply source and with the valve 15 adapted to control the outlet and not the inlet. With such an arrangement I make the outlet or discharge pipe 13 of larger capacity than the inlet 12. Hence if the valve is open the vessel cannot fill, but liquid is running

through. As soon however as the valve is closed partially or entirely the water is retained and the weight of the vessel is thereby more or less increased depending upon the position of the valve.

The operation of the various elements and their several functions is as follows, it being premised that the paper-web is moving in the direction, as indicated by arrow, while the liquid valve 15 is open, and the steam valve likewise, the lever arm being in a horizontal or upraised position. With this premise for purposes of illustration I will assume that the steam supply is excessive in which event the paper-web becomes too dry, and its contraction causes an increase of tension with pressure upon the roll 2, which is depressed in its bearings. Such action partially or entirely closes the valve 15 and the liquid contents of the receptacle 10 are increased, it being understood that the pipe 12 is in free communication with the liquid supply source. As a consequence the lever is depressed moving upon the valve trunnions 8, 8', as a fulcrum, and the steam valve is thereby actuated in proportion to the necessities of the paper. Should the paper-web be extremely dry the tension is necessarily strong and the discharge valve is entirely closed, as likewise the steam valve. Hence I have a positive arrangement with extremely simple mechanism, whereby to automatically control the supply of steam, completely in

accordance with the exigencies of the paper-web in process.

There is nothing complicated about the apparatus, and even should the discharge valve 15 not fit tightly the steam valve 20 can, by means of the spring 23, be adjusted to conform with the position of the lever-arm under such existing conditions.

What I claim is—

1. The combination with a spring-mounted roll adapted to be actuated by a traveling paper web, and a steam valve, of a liquid-weighted lever, adapted to control said steam valve, and mechanism for varying the liquid contents of said lever directly through spring-movement of the roll, substantially as set forth.

2. A spring-actuated revoluble roll, suitably mounted, an oscillating valve-case, its liquid valve operated by the vertical movement of said roll, combined with a liquid-tight receptacle affixed upon a lever-arm united to said valve-case, a steam-valve actuated by said lever-arm, and supply and discharge pipes for said receptacle, all operating as herein stated and described.

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

RICHARD SMITH.

Witnesses:

W. H. LOVELL,
Z. C. TITU.