

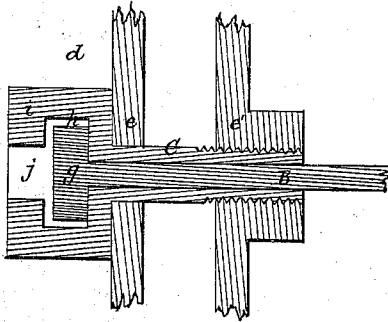
C. J. BRADBURY.

Improvement in Suction-Boxes of Paper Machinery.

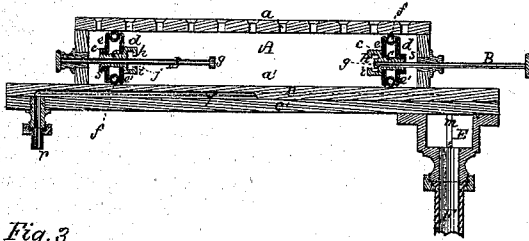
No. 131,732.

Patented Oct. 1, 1872.

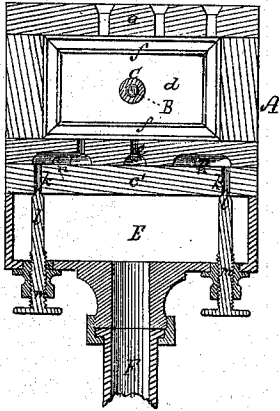
*Section of head—enlarged.*



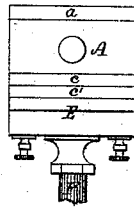
*Fig. 2.*



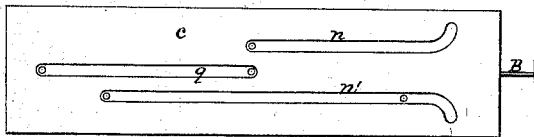
*Fig. 3.*  
*Enlarged.*



*Fig. 4.*



*Fig. 5.*



Witnesses.

*Howard Gill*  
*W. B. Boardman*

Charles J. Bradbury,  
by *J. Curtis*  
Att'y.

# UNITED STATES PATENT OFFICE.

CHARLES J. BRADBURY, OF CHARLESTOWN, ASSIGNOR TO HIMSELF AND  
GEORGE W. RUSSELL, OF LAWRENCE, MASSACHUSETTS.

## IMPROVEMENT IN SUCTION-BOXES OF PAPER MACHINERY.

Specification forming part of Letters Patent No. 131,732, dated October 1, 1872.

*To all whom it may concern:*

Be it known that I, CHARLES J. BRADBURY, of Charlestown, Middlesex county, Massachusetts, have invented certain Improvements in Suction-Boxes of Paper Machinery, of which the following is a specification:

These improvements consist, first, in a novel mode of connecting to each movable gaging-head or partition the rod which actuates it, in such manner that said rod may, after it has performed its duty, be pushed inwardly into the interior of the box, and not obstruct the space about the paper-machine, as heretofore. Secondly, these improvements consist in the employment of a tubular packing of elastic material, whereby to insure a tight joint between the outer edges of each movable head and the walls of the box, the tubular form of packing giving greater distension with a given contraction of the two sides of the head, and presenting a very small bearing-surface to the walls of the box when contracted, substantially as stated. Third, these improvements consist in a certain arrangement of ports, passages, and valves for admission and escape of water to and from the interior of the box, whereby an extremely simple and effective result is obtained.

The drawing accompanying this specification represents, in Figure 1, an end view; in Fig. 2, a vertical and longitudinal section; and in Fig. 3, a vertical and transverse section of a "suction-box" containing my improvements. Fig. 4 is an under-side view of the upper portion of the said box.

In the drawing, A represents a rectangular oblong box having a foraminous top or cover, *a*, and a double bottom, *c c'*, the interior of the box being provided with two twin-shaped, oppositely-disposed, movable heads or partitions, *d d'*, which serve to divide the interior of the box into three compartments, the center of which corresponds in length to the width of the endless film or sheet of pulp which travels over the top of the box. As is well known, the purpose of the suction-box of paper machinery is to extract, by suction, the water contained in the pulp which passes over it; and in order to exclude air from the interior of the box through its foraminous cover, which would otherwise break the vacuity, the mova-

ble heads are provided, and they are to be so placed as to coincide with the edges of the film of pulp, in order not only that air may be prevented from passing outside of it, but to extract the water from it entirely out to its edge, or practically so; while, in order that water may be prevented from entering the vacuum-chamber between the heads, it has been customary to form the latter in two portions, with an intervening plate of solid rubber, so that, by screwing the said two portions together by a suitable screw-rod, the area of the rubber plate is enlarged and fills tightly the interior of the box, and constitutes an impervious transverse partition. These rods, as heretofore used, especially when a wide sheet of paper is being fabricated, extend into the machine-room, and obstruct the free passage-way about the machine, and are a matter of considerable annoyance.

In carrying out my present improvement I proceed as follows: Each head *d* is composed of two rectangular plates, *e e'*, of a size slightly less than that of the box A in cross-section, while between these plates and extending entirely around their edges, as well as protruding slightly beyond the latter, I dispose a packing, *f*, composed of elastic tubing, mitered at the corners to insure a close fit. B represents a slender rod passed through each end of the box A, or a stuffing-box applied thereto, and also loosely through a cylinder or sleeve, C, which plays loosely within the inner plate *e'* of each head, and is screwed through the outer plate *e*, the said rod being formed with a small rectangular head, *g*, which is disposed within a cross-groove, *h*, formed in the inner end of the head *i* of each sleeve, the groove *h* possessing a contracted mouth, *j*, of sufficient width to allow of passage of the head of the rod. The rod B, by means of its head *g*, is capable of turning the sleeve C in one or the other direction, and consequently compelling the plates *e e'* to converge or separate, while with such convergence or separation the outer area of the packing *f* is increased or diminished. By the employment of a tube whereof to produce a packing is effected with less turns of the rod B than would otherwise be the case, and the packing, when in a nor-

mal state, presents very little bearing-surface to the interior of the box, thus allowing the position of each head to be easily changed without friction. By the use of the peculiarly-formed head of the sleeve C the rod becomes available not only to rotate the sleeve for purposes stated, but to force the head inward or outward, as the case may be, and to allow the rod itself, when its work is done, to be removed from contact with the sleeve and pushed inward within the box A to its full extent, for reasons before given. The herein-described construction and arrangement of the two plates *e e'*, the rod B, and sleeve C constitute the means of carrying out the first portion of these improvements, and the tubular packing *f*, in connection with the said plates *e e'*, the second portion thereof.

In carrying out the third portion of my present improvements I attach to the under side of the movable bottom or plate D of the suction-box a valve box or case, E, provided at the bottom with a filling-orifice, F, through which water from a suitable source enters and fills it, and also with two outlet-ports, *k k*, leading upward from its upper part, these ports being controlled by suitable valves *l l*, the stems *m m* of which descend and screw through the bottom of the case, and are provided at the bottom with buttons by which they may be easily turned, and either tightly close one or the other of the ports against the passage of water thereat, or open the same to flowage of water through it. In the under side of the bottom *c* of the box A, and upon each side of its center, I create two longitudinal channels, *n n'*, which constitute prolongations of the ports *k k* and extend one to the center of said bottom *c* and upward into the interior of the vacuum-chamber *a'* of the box A, and the other upward into the opposite ends of the box A and outside of each movable head *d*. The channel *n* is to supply water to the central portion or suction-chamber *a'* of the box when necessary in producing a vacuum, and the channel *n'*, by means of its vertical branches, is to supply water to each end com-

partment *s s* of the said box, which compartments are to be always full to overflowing, in order, as before stated, to prevent air from passing between the top of each head and the top of the suction-box, or the same and the sheet of pulp traveling over it. In addition to the side channels *n n'* last named, I create in the bottom *c* a central channel, *q*, which leads from the center of the vacuum-chamber *a'* to the end of said bottom, and is provided with a discharge-port, *r*, and valve *t*, the said channel *q* being the means whereby the water which is employed in the chamber *a'* in producing a vacuum is discharged therefrom. In lieu of the above-described arrangement of ports, valves, and channels, I propose to remove the supply of water from the valve-chamber E and use it as a discharging-orifice, taking the water directly into the three chambers *a' s s*, the water being discharged in this event from the vacuum-chamber *a'* through the channel *n* and port *k*. In this manner I am enabled to dispense with the channel *q* and its valve *t*, and control the entire water-source of the suction-box at its front end.

I claim—

1. The herein-described construction, arrangement, and combination of the rod B, head *d*, and sleeve C, or substantially the same, whereby like results are produced, for purposes stated.

2. I do not claim broadly a tubular packing, but I claim the employment, with the movable heads *d* of suction-boxes in paper machinery, of a packing composed of a tube of elastic material, substantially as and for the purposes herein described.

3. I claim the herein-described arrangement of the valve-box E, ports *k k* with their valves *l l*, channels *n n'* and *q*, and inlet pipe or orifice F, the whole being substantially in manner and operating as stated.

CHARLES J. BRADBURY.

Witnesses:

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A. PATTERSON.