

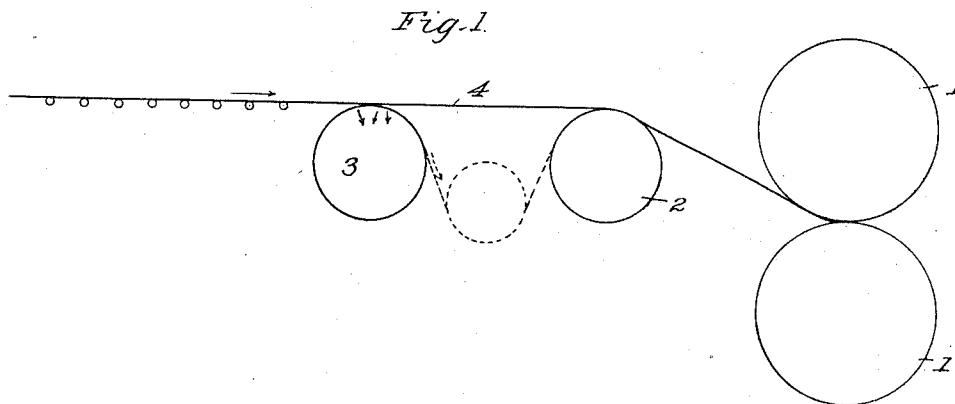
(No Model.)

M. D. KEENEY.
SUCTION BOX.

2 Sheets—Sheet 1.

No. 581,733.

Patented May 4, 1897.



Witnesses:

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Thomas E. Turpin

Inventor

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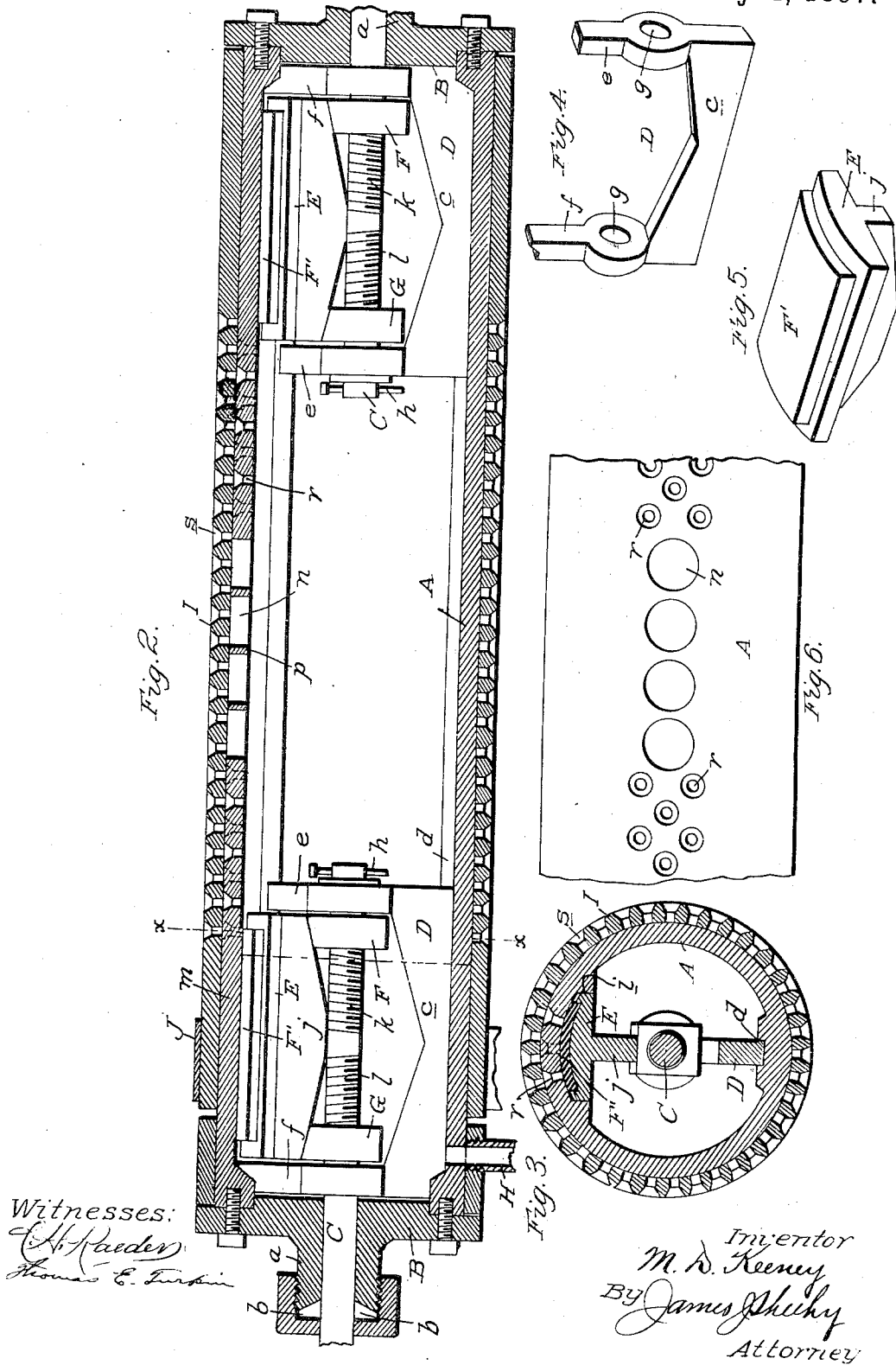
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M. D. KEENEY
SUCTION BOX.

2 Sheets—Sheet 2.

No. 581,733.

Patented May 4, 1897.



Witnesses:
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UNITED STATES PATENT OFFICE.

MARBLE D. KEENEY, OF ANTIOCH, CALIFORNIA.

SUCTION-BOX.

SPECIFICATION forming part of Letters Patent No. 581,733, dated May 4, 1897.

Application filed November 19, 1896. Serial No. 612,685. (No model.)

To all whom it may concern:

Be it known that I, MARBLE D. KEENEY, a citizen of the United States, residing at Antioch, in the county of Contra Costa and State of California, have invented certain new and useful Improvements in Suction-Boxes; and I do 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.

My invention relates to revoluble suction-boxes for paper-making machines; and it has for one of its objects to provide a revoluble suction-box embodying such a construction that the line of suction may be made very narrow, so as to enable the box to draw water from the sheet or web of paper as such sheet or web of paper and the wire carrying the same pass over the box, and thus render it unnecessary to carry the wire and paper around or partly around the cylinder or box.

Another object of the invention is to adapt the revoluble cylinder to receive a drive-belt, whereby said cylinder may be driven at the same speed as the felt or wire which takes over it, to take all strain off said felt or wire; and still another object of the invention is to provide a revoluble suction-box embodying means whereby it may be readily adjusted to adapt it for drawing water from sheets of various widths.

Other objects and advantages of the invention will be fully understood from the following description and claims when taken in conjunction with the accompanying drawings, in which—

Figure 1 is a diagrammatic view illustrating the arrangement of my improved suction-box in a Fourdrinier paper-making machine. Fig. 2 is a sectional view of the suction-box with some of the parts in elevation. Fig. 3 is a transverse section taken in the plane indicated by the line *xx* of Fig. 2. Fig. 4 is a perspective view of one of the slides or carriages removed from the cylinder. Fig. 5 is a perspective view of one of the rubber-faced blocks carried by the slides, and Fig. 6 is a detail plan view of a portion of the stationary cylinder.

In the said drawings similar numerals and letters designate corresponding parts in all of the views, referring to which—

1 indicates the couch-rolls usually embodied in Fourdrinier paper-making machines.

2 indicates the roll usually arranged in rear of the couch-rolls.

3 indicates my improved suction-box, which is arranged in rear of the roll 2, and 4 indicates the ordinary wire which passes over the suction-box 3 and the roll 2 and between the couch-rolls, and is designed to carry the sheet or web of paper in the ordinary manner.

Referring more particularly to Figs. 2 to 6, A indicates the stationary cylinder of my improved suction-box, which may be formed of cast metal or other suitable material. This cylinder A has its ends closed by caps B, and the said caps, which are connected in an airtight manner with the ends of the cylinder, have tubular extensions *a*, designed to be mounted in the frame of the paper-making machine to support the suction-box in its proper operative position.

The tubular extensions *a* of the caps B have stuffing-boxes *b* on their ends and are designed for the passage of the handle-rods C of the slides or carriages D, as shown. These slides or carriages D respectively comprise a horizontal body *c*, which is arranged and adapted to move in a longitudinal groove or guideway *d* in the lower portion of the cylinder A and the upright arms *e f* at the ends of the body *c*, which have apertures *g* to receive the handle-rod C, said rod being secured to the carriage by a pin *h* or other suitable means.

E indicates blocks which are curved, as shown, in conformity to the inner surface of the cylinder A and have faces *F'*, of rubber or other packing material, for a purpose presently described. The said blocks E are arranged and adapted to move in a groove *i* in the upper portion of the cylinder A, and they have the longitudinal central depending portions *j*, which are arranged between the arms *e f* of the carriages D, whereby it will be seen that they will move with the carriages when the same are adjusted. These depending portions *j* of the blocks E have their lower edges beveled or inclined, as shown, for the engagement of the oppositely-threaded nuts F G, which are mounted on the oppositely-threaded portions *k l* of the rods C and have their upper sides beveled in conformity to the lower edges of the portions *j*, as shown. In

virtue of this construction it will be seen that when the rods C are turned in one direction the nuts F G will be moved toward the middle of the portions *j*, and in consequence the rubber faces or packing F' will be pressed tightly against the inner side of the cylinder A, for a purpose presently described, while when the rods C are turned in the opposite direction the nuts F G will be moved toward the arms *e f* of the carriages D, and the said carriages may then be moved in the direction of the length of the cylinder through the medium of the said rods C, for a purpose presently described.

At its ends the cylinder A is provided with the imperforate portions *m*, of about the proportional length illustrated, and at its middle it has the row of comparatively large apertures *n*, with portions of metal *p* between them, such apertures being provided instead of a continuous slot for the sake of strength and durability. Between the ends of the row of apertures *n* and the imperforate portions *m* said cylinder A has two (more or less) rows of apertures *r*, which are flared or reamed out at their outer ends, as shown, to facilitate the entry of water and air into the same, as will be presently pointed out.

In virtue of the construction thus far described the suction-box may be adapted for drawing water from sheets of various widths, it being simply necessary when the width of the sheet corresponds to the combined length of the rows of apertures *n r* to draw the carriages D to a position within the imperforate portions *m* of the cylinder, and when the width of a sheet is less than the combined length of the rows of apertures *n r* to move the carriages D inwardly or toward each other until the inner ends of the rubber or packing faces F' rest in alinement with the edges of the sheet, and then turn the rods C to force and hold the said rubber faces F' tightly against the inner side of the cylinder A, and thus close, in a water-tight manner, all the apertures *r*, except those covered by the sheet. In this way the suction-box may be readily adapted for drawing water from a sheet of a width corresponding to the combined length of the rows of apertures *n r*, from a sheet corresponding in width to the length of the row of apertures *n*, and from sheets of various widths between these two limits.

It will be observed that with the adjustable blocks having the rubber or packing faces F' and the apertures *r* in the cylinder A, having their outer ends flared or reamed out, as shown, the suction-box may be readily adapted to draw water from a sheet throughout the width thereof without permitting the entry of air into the box or into the cylinder A at opposite sides of the sheet, and thus all the force of the suction device (not illustrated) will be expended in drawing water from the sheet, as is desirable. The suction device which, as stated, is not illustrated, and which may be of any suitable construction,

is connected with the interior of the cylinder A by the pipe or conduit H. (Illustrated in Fig. 1.)

When desirable, the rows of small apertures *r* may extend from one imperforate portion *m* of the cylinder A to the other, and in consequence the comparatively large apertures *n* may be dispensed with. I prefer, however, to employ the said apertures *n* at the middle of the cylinder, as they may be formed much easier than the apertures *r*. I also do not desire to be understood as confining myself to the peculiar apertures *r*, although they are advantageous, as any suitable apertures may be employed.

I indicates the revoluble cylinder over which the wire and the sheet or web of paper passes. This revoluble cylinder I is preferably of brass, so as not to corrode, and it is provided with apertures *s*, which preferably have their outer ends flared or reamed out, as shown, to facilitate the entry of water and air into the suction-box and also to preserve the strength of the cylinder. The said cylinder I is also provided at its ends with the imperforate portions of about the proportional lengths illustrated, which bear upon the imperforate portions of the stationary cylinder A, as shown. These imperforate portions of the two cylinders are designed to receive lubricant between them, and consequently it will be observed that when the suction-box is first used the perforated portions of the cylinders will wear a little and then the cylinder I will be supported upon the imperforate portions of the cylinder A, and in consequence wear of the perforated portions will cease. This is an important advantage, since it prolongs the usefulness of the cylinders.

J indicates the belt for driving the cylinder I, which takes around said cylinder at one end thereof and is designed to take around the drive-pulley of a motor or around a pulley on some shaft of the paper-making machine. This belt J is provided in order to take all strain off the wire and web or sheet of paper which pass over the cylinder I, in the manner before described.

When desirable, the induction-passage formed in the cylinder A by the apertures *n r* may be increased either by increasing the number of rows of apertures or by increasing the size of such apertures, and it will be obvious that as the width of the induction-passage is increased the width of the rubber or packing faces F' of the blocks E must also be increased. It will also be obvious that when the width of the induction-passage is increased a roller (illustrated by dotted lines in Fig. 1) must be employed to bring the wire and the web or sheet of paper partly around the suction-box in the manner shown by dotted lines, so that the web or sheet of paper will at all times entirely cover such induction-passage. I prefer, however, to have the induction-passage of about the proportional width shown in Fig. 3 and to arrange the same

as illustrated, so as to subject a sheet to suction as it passes over the suction-box and without the necessity of carrying such sheet around or partly around the suction-box.

5 In Fourdrinier machines when it is desired to use a wide suction and carry the wire and the web or sheet of paper partly around the suction-box the said suction-box may be arranged in the position which the roll 2 occupies and said roll 2 may be dispensed with.

10 The suction-box is also adapted to be used as a coucher in cylinder-machines, in which case the width of the induction-passage or the width of the line of suction may be increased to one-half, or even more, of the circumference of the box, the felt being carried around the box, to always cover the induction-passage, by suitably-arranged rolls.

15 With all of its advantages it will be observed that my improved suction-box is easily made and embodies but a small number of parts, and may therefore be produced and sold with profit for a comparatively small price.

20 I have in some respects specifically described the construction and relative arrangement of the parts of my improved suction-box in order to impart a full, clear, and exact understanding of the same. I do not desire to be understood, however, as confining myself to such specific construction and arrangement of parts, as such changes or modifications may be made in practice as fairly fall within the scope of my invention.

25 Having described my invention, what I claim, and desire to secure by Letters Patent, is—

30 1. In a suction-box the combination of a stationary cylinder adapted to be connected with a suction device and having an induction-opening and an eduction-opening, a foraminated, revoluble cylinder arranged upon the stationary cylinder, a carriage arranged within the stationary cylinder, a rotatable handle connected to the carriage and having 40 right and left hand threads, nuts mounted on said right and left hand threads and having one of their sides beveled, a block having a side beveled in conformity to and bearing upon the beveled sides of the nuts, and pack-

ing carried by said block and adapted to bear 50 against the inner side of the cylinder and partly close the induction-opening thereof, substantially as and for the purpose set forth.

2. In a suction-box, the combination of a stationary cylinder adapted to be connected 55 with a suction device and having a longitudinal induction-opening or series of openings and an eduction-opening and also having imperforate portions at their ends, a foraminated revoluble cylinder arranged upon the 60 stationary cylinder and having imperforate portions at their ends bearing on the imperforate portions of the stationary cylinder, carriages arranged in a guideway in the stationary cylinder, rotatable handle-rods connected to the carriages and having right and 65 left hand threads; said rods being extended through the ends of the cylinder, nuts mounted on the right and left hand threads of the rod and having one of their sides beveled, 70 blocks carried by the carriages and having one of their sides beveled in conformity to and bearing upon the beveled sides of the nuts, and packing carried by said blocks and adapted to bear against the inner side of the 75 stationary cylinder and partly close the induction-opening thereof, substantially as and for the purpose set forth.

3. In a suction-box the combination of a stationary cylinder adapted to be connected 80 with a suction device and having an induction-opening or series of openings and an eduction-opening, a revoluble foraminated cylinder arranged upon the stationary cylinder, a carriage arranged in the stationary cylinder, packing adjustably mounted on the 85 carriage, means for adjusting the carriage and means for adjusting and adjustably fixing the packing with respect to the stationary cylinder, substantially as and for the purpose 90 set forth.

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

MARBLE D. KEENEY.

Witnesses:

FRED F. PARTRIDGE,
ROBERT CADDES.