(No Model.)

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SUCTION APPARATUS FOR PAPER MAKING MACHINES.

No. 419,900. Patented Jan. 21, 1890.

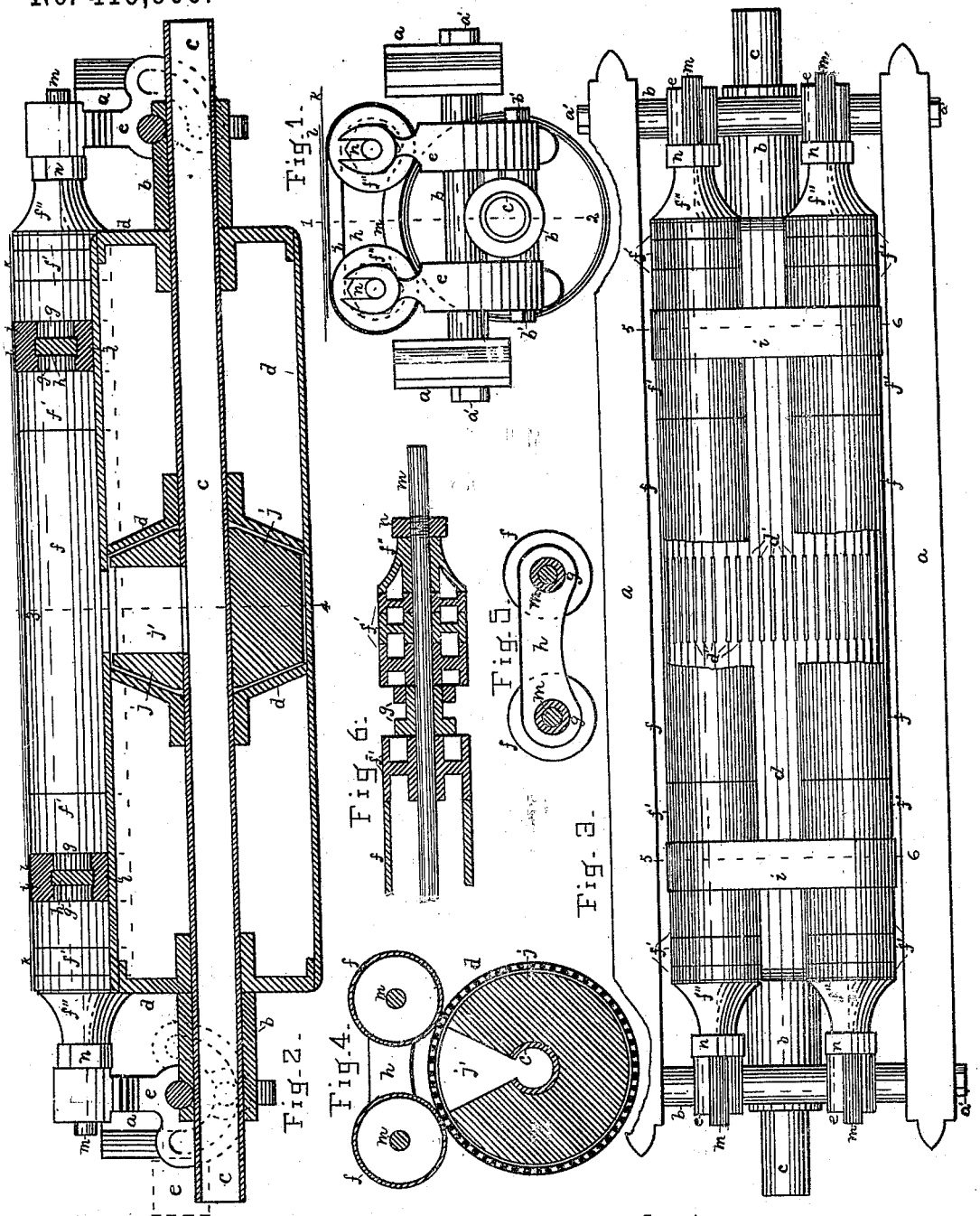

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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SUCTION APPARATUS FOR PAPER-MAKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 419,900, dated January 21, 1890.

Application filed August 26, 1889. Serial No. 321,935. (No model.)

To all whom it may concern:

Be it known that we, MARTIN VAN RYZIN, OMER W. DODGE, and THOMAS PATTEN, citizens of the United States, residing at Appleton, in the county of Outagamie and State of Wisconsin, have invented a new and useful Improvement in Suction Apparatus for Paper-Making Machines; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which are made a part of this specification.

Figure 1 is an end view of the device supported in its individual frame and having the wire of the machine and the paper thereon in their working position above the device; Fig. 2, a vertical section lengthwise of the device upon the line 1 2 of Fig. 1; Fig. 3, a top view of the same, as shown in Figs. 1 and 2, parts of the upper rolls being broken away; and Figs. 4, 5, and 6, detail views.

Similar letters of reference indicate like parts in the several views.

a indicates the frame, which may be of wood, and within which the device is contained; *b*, connecting-hangers, which connect the frame-timbers *a*, and from which are supported the several parts composing the device; *c*, a pipe supported within the connecting-hangers *b*, to which a suction-pump may be attached at either end thereof, as its location may require, and upon which pipe the hollow cylinder *d* is arranged to revolve freely; *e*, journal-box standards, which carry the rolls *f*; *g*, collars and washers upon the rolls *f*; *h*, yokes upon said collars connecting the two rolls *f*; *i*, india-rubber bands passing around said rolls and forming an air-tight joint at the point of their location for adapting the suction device to any desired width of paper, said bands and the connecting-yokes *h* having means provided for their location upon the rolls *f* at numerous determined points, as will be hereinafter explained; *j*, a cylindrical formed conductor having a tunnel-opening *j'* leading from its upper surface to a central opening through the pipe *c*, and forming thereby a channel through which the suction of the suction-pump acts in removing the moisture from the pulp; *k*, the wire pulp and paper carrier, and *l* the pulp or paper thereon.

The frame-timbers *a a*, of the length required to adapt them to the paper-machine, are connected together by the hangers *b b*, which extend across between said timbers, and with which they are connected by the bolts *a'*, said frame being arranged under the wire or at any point for which its purpose is required and transversely of the paper-machine frame. The pipe *c* is supported firmly in the connecting-hangers *b b* at each end of the frame, and carries near its middle the aforementioned cylindrical conductor *j*, having the tunnel-opening *j'*, (a transverse section of said conductor upon the line 3 4, Fig. 2, is shown in Fig. 6,) the particular form of said conductor and its tunnel-opening being immaterial, except that the form of the sides of the mouth *j'* conforms nearly to the inside of the revoluble cylinder *d* and forms a comparatively tight joint with it.

The cylinder *d* is constructed with an interior cavity within which the conductor *j* is located, said cylinder being revoluble upon the pipe *c* around the fixed conductor *j*. The exterior shell of the cylinder *d* has formed in it a series of narrow slits or perforations *d'*, which correspond in position longitudinally with the tunnel-opening in the conductor *j*, and whose length should not exceed the length of said opening. The rolls *f* are broken away in Fig. 3 for the purpose of showing the aforesaid slits. The aforesaid slits may be a series of fine holes, or the narrow slits, as shown, the combined area of the number of openings which will be at any time during the revolution of said cylinder between the rolls *f f* being in excess of the area of the pipe *c*.

The journal-box standards *e* are journaled upon the hangers *b*, and can be oscillated thereon, as indicated in dotted lines by the horizontal position of the standard at the left of Fig. 2, for the purpose of permitting the rolls *f f* to be withdrawn from their position under the wire *k*. They are secured in an upright position by means of the bolt *b'*.

The rolls *f*, as shown more fully in detail

drawings, Fig. 6, consist of sections of different length f' for a portion of their length, and have at each end of the rolls washers f'' and nuts n. They have also near their ends collars having each a head and washer g, between which head and washer the yoke h is arranged and connects the two rolls to each other, but permits one roll to revolve independently of the other. (See Fig. 5, which is a transverse section of the rolls f f and the yoke h upon the line 5 6, Fig. 3.) The several sections composing the rolls are fitted loosely upon the shaft m, and are secured thereon by the nuts n. The rolls, although having their journals m revoluble in the standards e, are not supported by them, said standards serving only as guides for preserving the rolls from endwise movement, and also parallel with the cylinder d, upon whose surface they rest, and upon which they are revolved by the movement of the wire k over them, the friction of said rolls upon the cylinder causing it to revolve upon the pipe c, and thereby bringing the slits or perforations d' in succession over the tunnel-opening j', and thereby preserving a continual channel between the outer surface of the cylinder d and the pipe c.

Around the yokes h are india-rubber bands i, which are carried by the friction of the wire k thereon, and preserve in connection with the yokes h comparatively air-tight joints at the place of their location upon the rolls between the wire k and the cylinder d. The suction device without change, except in its location, is equally well adapted for use in connection with the felt, and we may in some places upon a paper-machine use a heavy felt instead of the wire k, with which the rolls will be revolved.

The collar and washers g are loose upon the shaft m, and by means of the changes which can be made in the arrangement of the several sections f' of the rolls the distance apart of said bands thereon can be adapted to the width of paper being made and the bands arranged at the edges of the web of paper.

In the operation of the suction device, as the paper-pulp l upon the wire k passes over it, a portion of the moisture therein is extracted by means of the suction through the pipe c, said moisture being drawn down through the wire, the slits d', and the opening j' into the pipe c, from whence it is carried away in the usual and well-known manner.

We are aware that a suction device has been invented having a revolving cylinder with perforations in its surface, which we do not claim as new; but

What we do claim, and desire to secure by Letters Patent, is—

1. The combination, in a paper-making machine, of a suction device comprising a pipe adapted for connection with a suction-motor, and being arranged transversely of the machine-frame, and having arranged thereon intermediate the sides of said frame a conducting-channel leading to said pipe, a cylinder revoluble upon said pipe, having perforations in its surface registering with the mouth of said conducting-channel, the rolls f f, arranged above said cylinder and adapted to be revolved thereon, and being connected one to the other by yokes which form an air-tight connection between said rolls near each end thereof, substantially as described.

2. The combination, in a paper-making-machine suction device, of a suction-pipe arranged transversely of the machine-frame, and having thereon intermediate the sides of said frame a conducting-channel leading to said pipe, a cylinder revoluble upon said pipe and around said conducting-channel, and having perforations in its surface registering with the mouth of said conducting-channel, the rolls f f, arranged above said cylinder and adapted to be revolved thereon, and being connected one to the other by yokes which form an air-tight connection between said rolls near each end thereof, said connections being arranged for removal nearer to or farther from each other, for adapting their position to register with the line of contact of the paper above said rolls, substantially as described.

3. The combination, in a paper-making-machine suction device having a revolving cylinder with perforations in its surface registering with the mouth of a conducting-channel and leading to a suction-pipe, of the rolls f f, arranged above said perforated cylinder and revoluble thereon, and having the yokes h h h h, connecting said rolls, and the india-rubber bands i i thereon, for forming an air-tight joint at said point, substantially as set forth and shown.

4. The combination, in a paper-making-machine suction device having the rolls f f, arranged parallel with each other, of the journal-boxes e e e e, pivoted under the journal of said rolls and adapted for being oscillated upon said pivotal point, and thereby thrown out of and into working position relative to said rolls, whereby the withdrawal from and insertion of the rolls into said suction device is permitted, substantially as described.

5. The combination, in a paper-making-machine suction device having a revolving cylinder with perforations in its surface registering with the mouth of a conducting-channel leading to a suction-pipe, of the rolls f f, arranged above said perforated cylinder and revoluble thereon, said rolls being composed of removable sections of different lengths for a portion of each end of the rolls, the connecting-yokes h h h h, and the india-rubber bands i i thereon, whereby said suction device may be adapted for different widths of paper, substantially as described.

6. In a paper-making-machine suction device, a frame therefor, the connecting-hangers b b, the suction-pipe c therein, having the con-

ductor *j* and the channel *j'* therein, the perforated cylinder *d*, revoluble upon the pipe *c*, the journal-box standards *e e e e*, pivoted upon the aforesaid connecting-hangers, the rolls *f f*, journaled in said standards *e*, and having the connecting-yokes *h h h h* and the india-rubber bands *i i* thereon, said yokes and bands being adapted for movement nearer to or farther from each other, all combined and operating substantially as described.

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