

(No Model.)

2 Sheets—Sheet 1.

H. A. BARBER.

SUCTION BOX FOR PAPER MAKING MACHINES.

No. 316,221.

Patented Apr. 21, 1885.

Fig. 1.

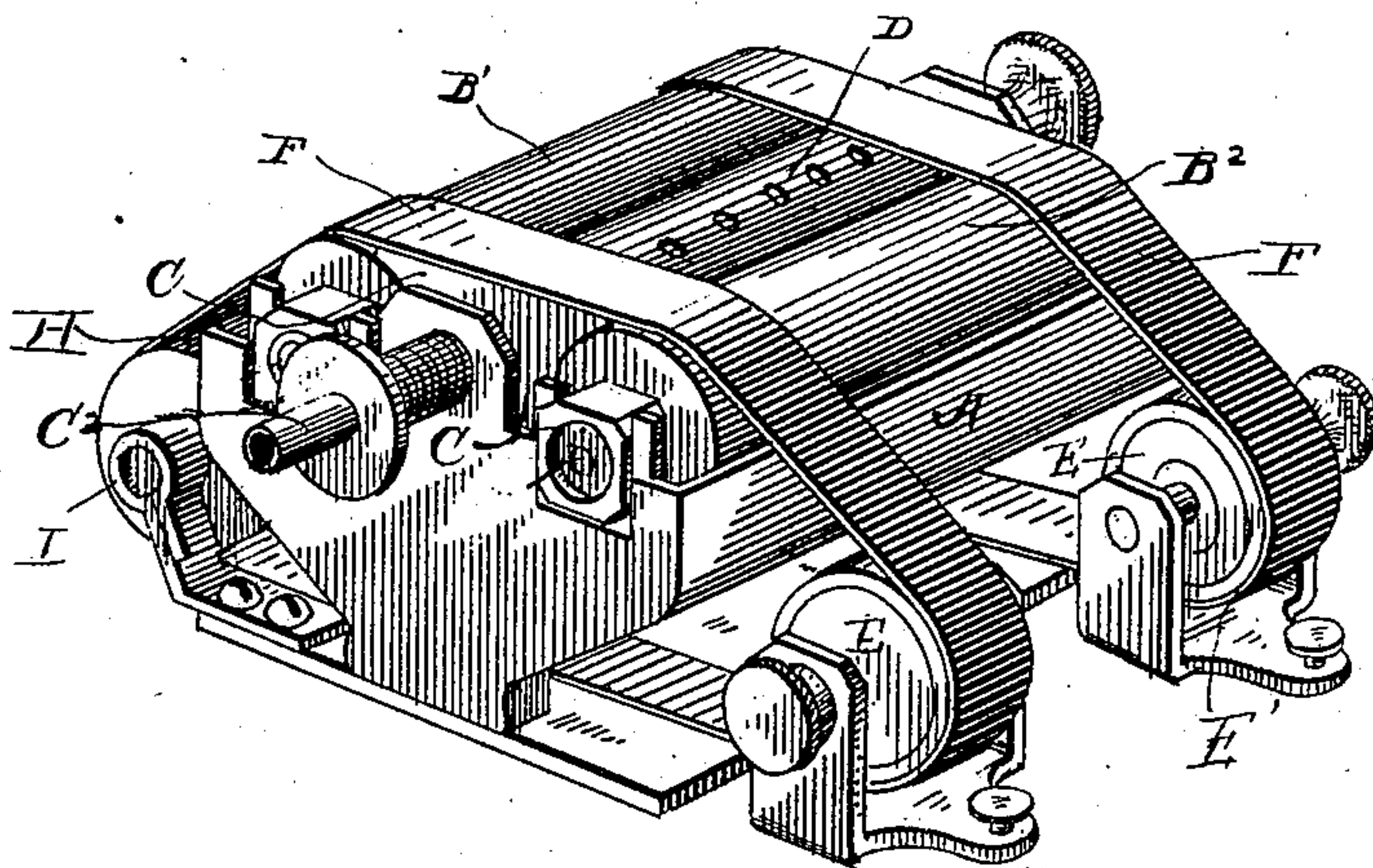
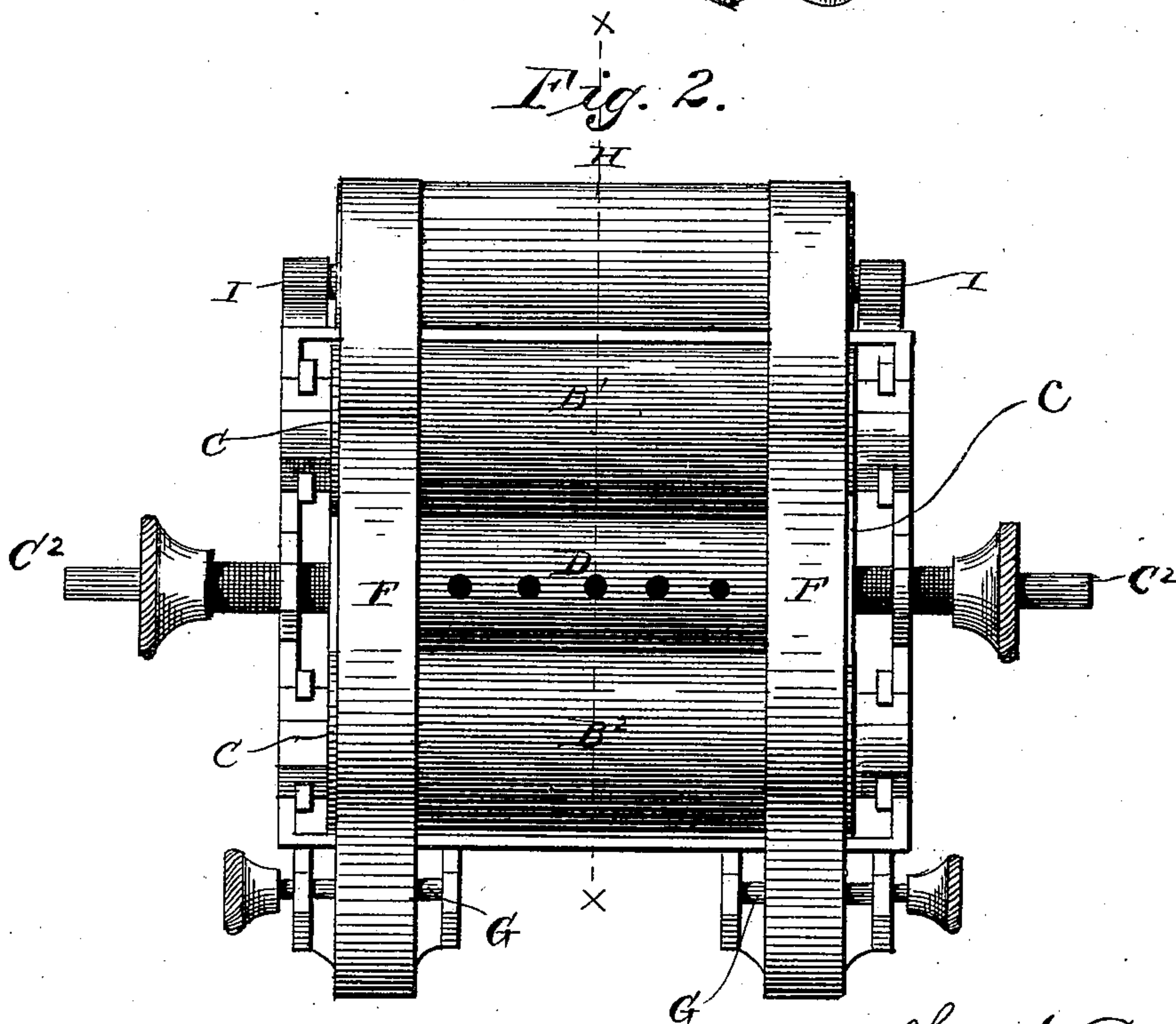


Fig. 2.



WITNESSES

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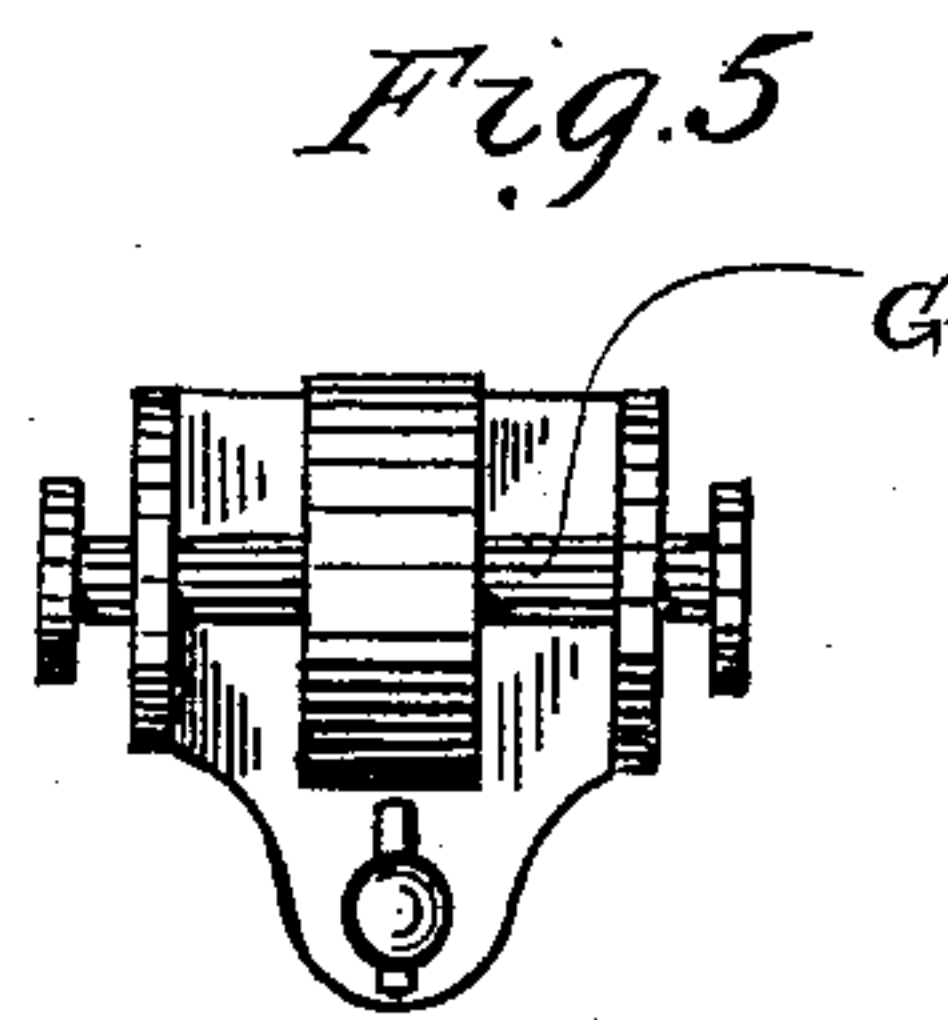
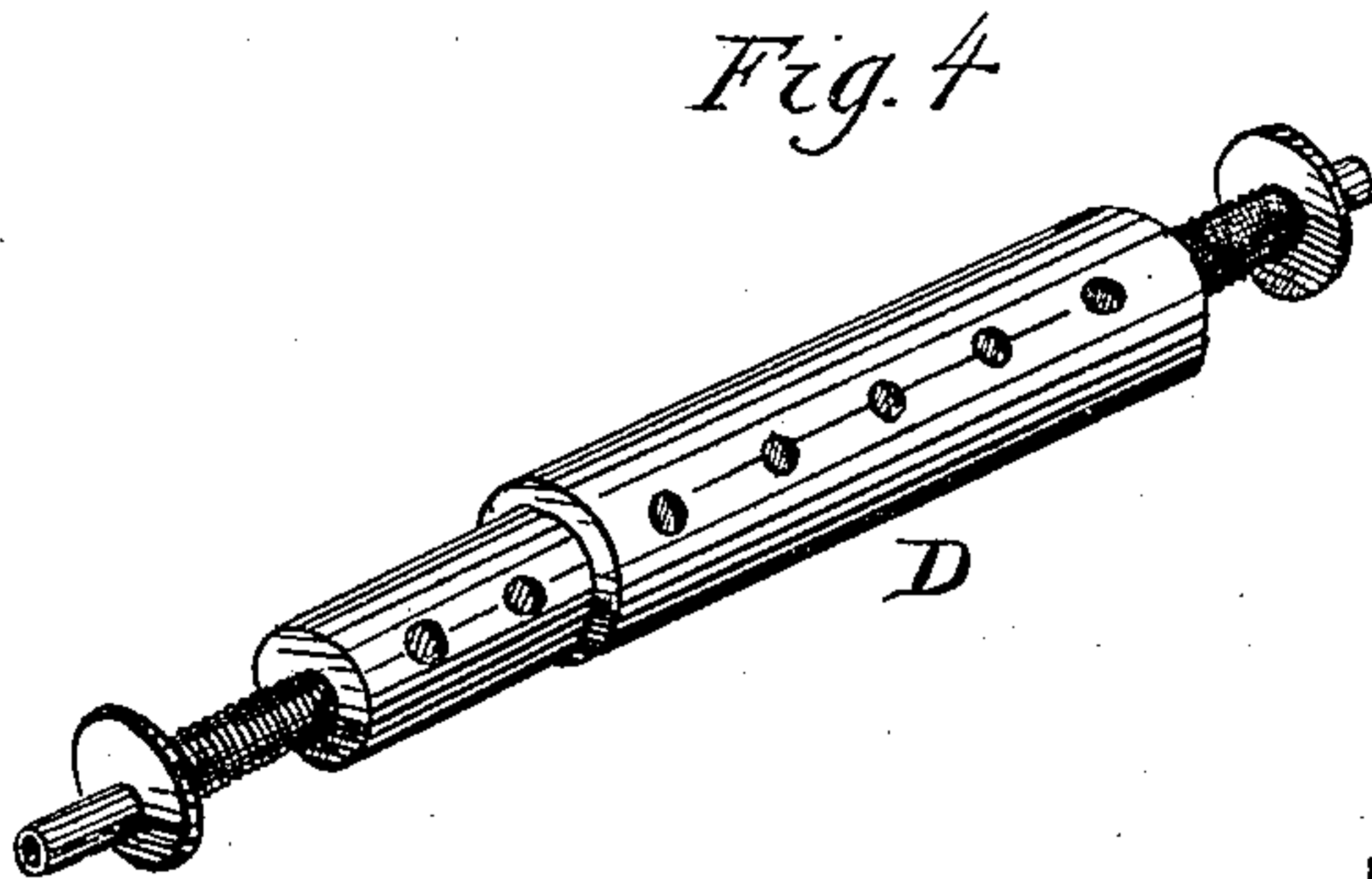
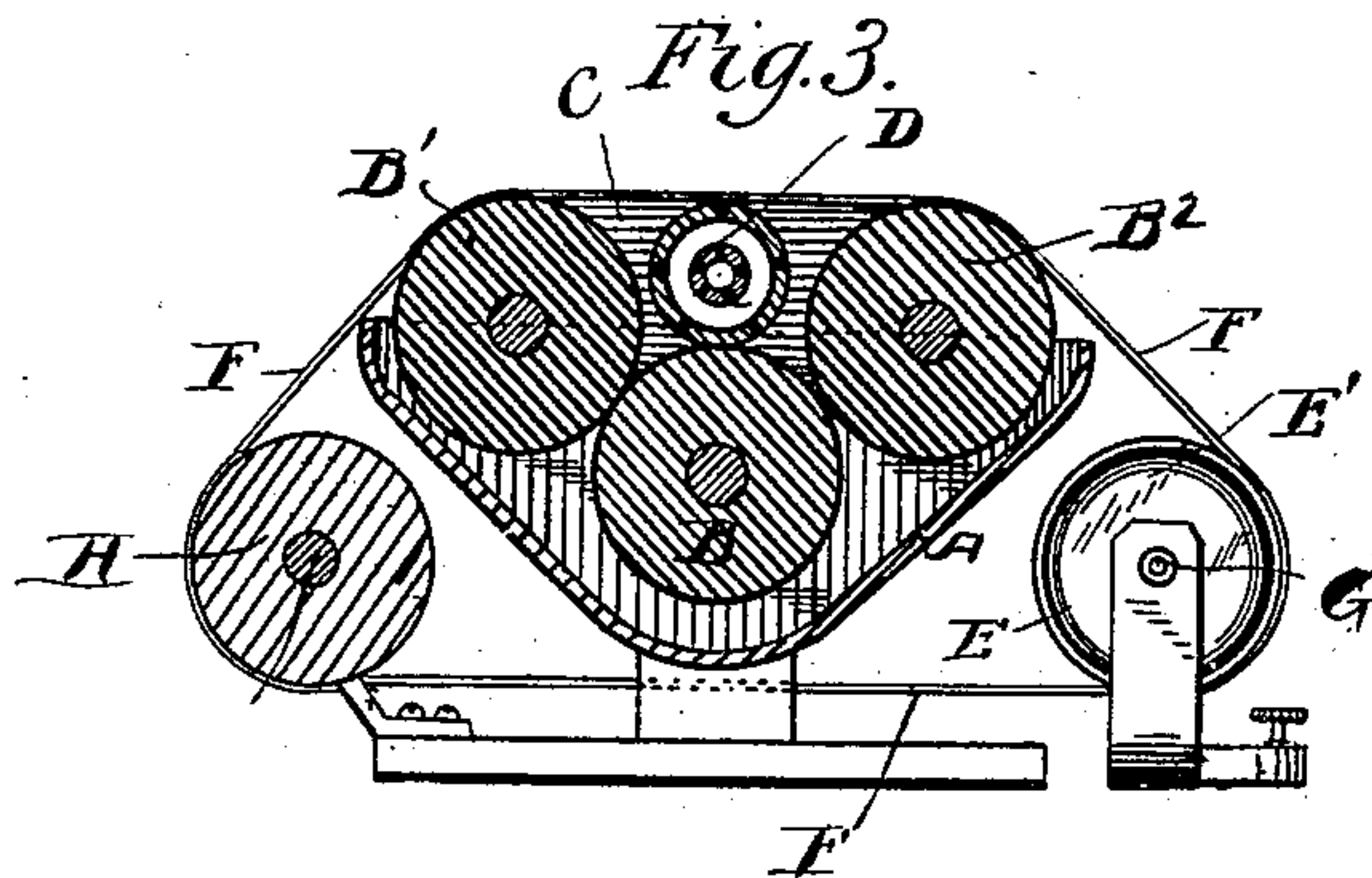
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UNITED STATES PATENT OFFICE.

HENRY ANREL BARBER, OF WATERTOWN, NEW YORK.

SUCTION-BOX FOR PAPER-MAKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 316,221, dated April 21, 1885.

Application filed July 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. BARBER, a citizen of the United States, residing at Watertown, in the county of Jefferson and State of New York, have invented new and useful Improvements in Suction-Boxes for Paper-Making Machines, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to suction-boxes to be used in paper-making machines for the purpose of extracting water, through an endless wire-cloth or felt, from paper-pulp or moist paper; and it is designed to provide a machine of the class referred to that shall possess superior advantages in point of simplicity, inexpensiveness, durability, and general efficiency; and the invention consists in the construction and novel arrangement of parts, as will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a view in perspective of a suction-box embodying my improvements. Fig. 2 is a plan view of the same. Fig. 3 is a vertical section on the line *x x* in Fig. 2, and Fig. 4 is a modification of the perforated roller D. Fig. 5 is a detail view.

Heretofore suction-boxes made for this purpose have been made with a perforated stationary cover, over which the endless wire or felt carrying the paper-pulp or moist paper is caused to slide. This necessarily causes a large amount of friction, loss or waste of power, and excessive wear of the wire or felt as it passes over the boxes. The object of my present invention is to reduce or overcome these defects by so constructing a box or boxes of the class referred to that there shall not be any sliding or rubbing motion of the endless wire-cloth or felt as it passes over the same. This desired result with my improved box is obtained by the use of rollers and endless bands or belts, which will be hereinafter more fully explained.

Referring by letter to the accompanying drawings, A designates a box or trough, made of any suitable material, of a length equal to about the width of a paper-making machine, (which is from four to six feet.) The size for

a six-foot machine will be about seventy-eight inches long by eighteen inches wide over all, and six inches deep. The trough A is necessarily of a width and depth sufficient to contain the rolls and other accessories, as shown.

B B' B² are three rolls or drums, of the same or about the same diameter, supported at their ends in suitable bearings in said box A.

C C are movable heads made to conform with the angles of the rolls B B' B², and made to fit as near as practicable air-tight against the rolls, so that little, if any, air will be admitted from that source.

The heads C C are made with a provision for an end motion between the three rolls B B' B², so that they can be moved inward or outward to adjust them to the width of the sheet of paper to be made, and are pushed in or drawn out by hand by the use of a threaded sleeve, or by any other suitable means.

D is a roll of less diameter than rolls B B' B², and rests on the face of the lower roll, B, rolling in contact with the same when in motion. It is perforated so as to maintain about the same suction on all sides.

Pipes C² enter the perforated roller D and project at the end through the heads of the box, the projecting ends of the pipes being connected by a hose or pipes to a pump or other exhausting apparatus which may be found desirable to use.

E E are guide wheels or pulleys provided with flanges E' or a crowning-face for the purpose of leading the bands or belts F F where it is desired they should run. The pulleys E E are also provided with suitable adjusting mechanism—such as screws—for straining the belts F F to the proper tension, and revolve freely on or in connection with movable shafts G G, for adjusting said pulleys to the different widths of paper to be made. The bands or belts F F are made of oiled silk, rubber, thin metal, or any other suitable material, it being desirable that they be made endless of some strong, thin, and pliable material, and as nearly water-proof as practicable.

H is a roll or drum running in suitable bearings, I, at its ends to carry the endless bands or belts as they pass around the box A.

The mode of operation of the improved suction-box is as follows: The bands F F being placed over and around the two rolls B' B², pulleys E E, and drum H, and a pump or other apparatus for producing a partial vacuum attached to the outer ends of the pipes C², that pass through the perforated roller D, an endless wire-cloth or felt covered with paper-pulp or moist paper on its opposite surface is caused to pass over and against the upper parts of the two upper rolls, B' B², perforated roll D, and that part of bands F F that pass over rolls B' B² and heads C C, thereby, when in motion, preventing any sliding or rubbing motion of any part of the wire-cloth or felt on any part of the box, causing the wire-cloth or felt, which are very expensive and perishable, to last much longer than they possibly could were they sliding in contact with a stationary perforated box, as they now commonly do. The perforated roller D, revolving on its lower surface against the lower roll, B, and its upper surface against the moving wire-cloth or felt, carries a part of the weight of the wire-cloth or felt, and the atmospheric pressure pressing against the moist sheet of paper lying against the wire-cloth or felt on the side opposite the rolls. Roll D is made hollow, and is perforated for the purpose of making a communication between the suction-pipes and that part of the rolls B B' B² inside of the heads C C and that part of the wire-cloth or felt which when in motion is continually passing over the box formed by the rolls B B' B² and the heads C C.

When it is desirable to make any great change in the width of the paper to be made, the roll D may be removed, and a longer one or a shorter one is substituted. I prefer, however, to make the roll D in sections, telescoping one within the other, as shown in Fig. 4, as it does not then need to be removed, but may be lengthened and shortened at will.

In practice the atmospheric pressure, amounting to several hundred pounds, will produce but little pressure on the end bearings of the rolls, for it will be readily seen that by this novel construction of box the pressure of wire-cloth or felt against the upper part of roll D is carried with a rolling motion against the lower roll, B, which in turn, by the partial vacuum maintained in the space

between the rolls, heads, and wire-cloth or felt, has a tendency to draw the lower roll, B, upward against roll D and the two rolls B' B², which also carry a part of the pressure of air against their upper sides.

It will also be perceived that the lower roll, B, by its rolling surface against the two upper rolls, B' B², with but little friction greatly assists in keeping the two upper rolls, B' B², (by the atmospheric pressure,) from being forced toward the center of the box formed by said rolls and heads, as before described.

The box A is to be filled with water when in use, in order to seal any small leaks at the ends or between rolls B and B' B², so that little, if any, air will enter from those parts.

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

1. The bands or belts passing over the rolls B B' B² and heads C, for the purpose of reducing friction on the wire-cloth or felt, said heads being movable and made to conform with the angles of the rolls, and to fit as nearly as practicable air-tight against the same, as described.

2. The perforated roll D, revolving against lower roll, B, at one side of the wire-cloth or felt against atmospheric pressure, substantially as specified.

3. The combination, with the box or trough A, provided with the rolls B' B² and the movable heads C, of the roll H, the pulleys E, having lateral and longitudinal adjusting mechanism, as described, and the bands F F, passing over the rolls B' B² H, heads C, and the pulleys E underneath the box or trough, as set forth.

4. The combination, with the box or trough, of the perforated roller D, connecting with an exhaust-power, the lower roller, B, and suitable guide-rolls, as set forth.

5. The combination, with the box or trough, of the roller D, connecting with the exhaust-power, the lower roll, B, guide-rolls B' B², and movable heads C C, as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

HENRY ANREL BARBER.

Witnesses:

EDWARD H BOHL,
JOSEPH J. BRAGGEN.