

No. 754,036.

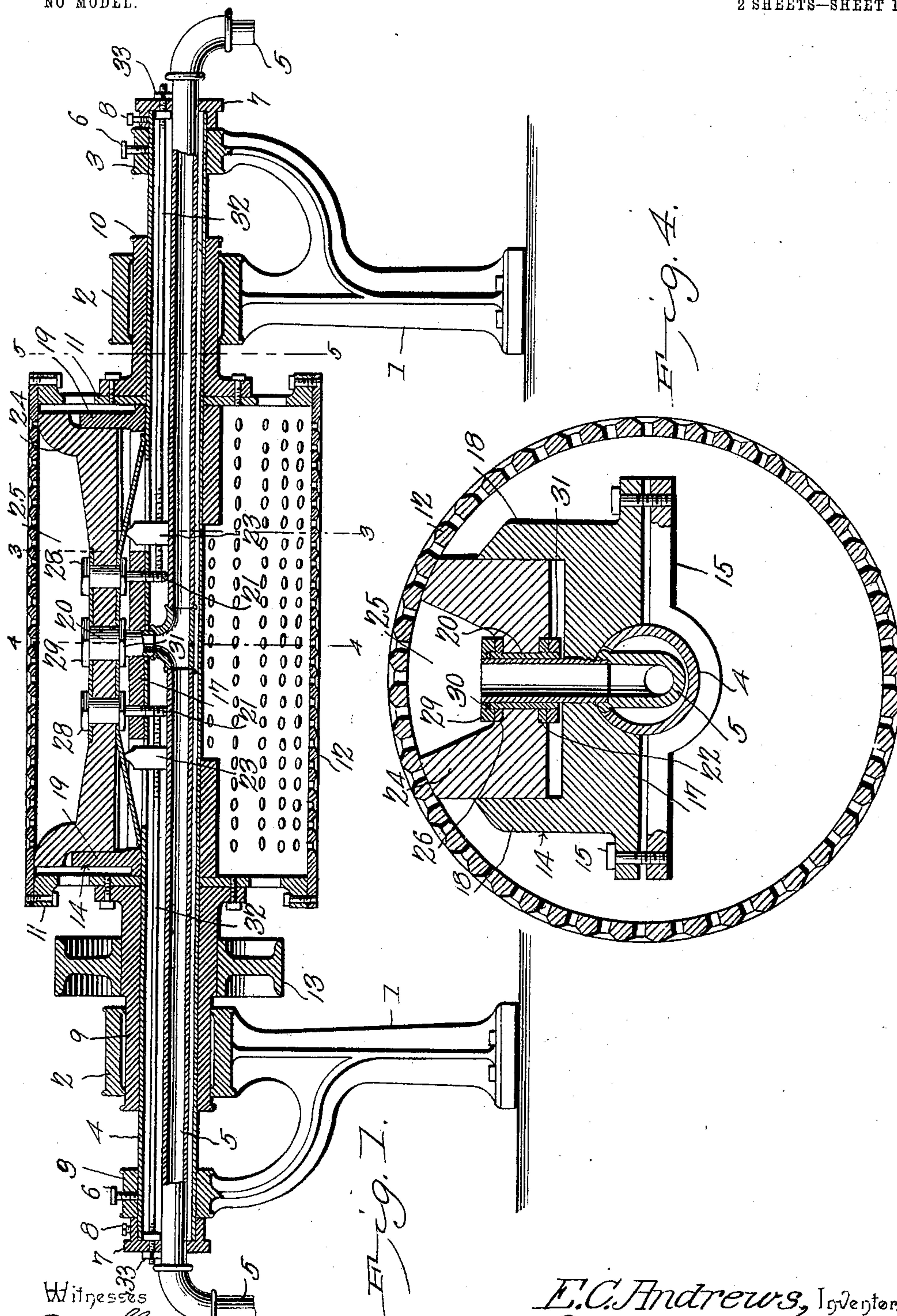
PATENTED MAR. 8, 1904.

E. C. ANDREWS.
SUCTION BOX FOR PAPER MAKING MACHINES.

APPLICATION FILED JUNE 8, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



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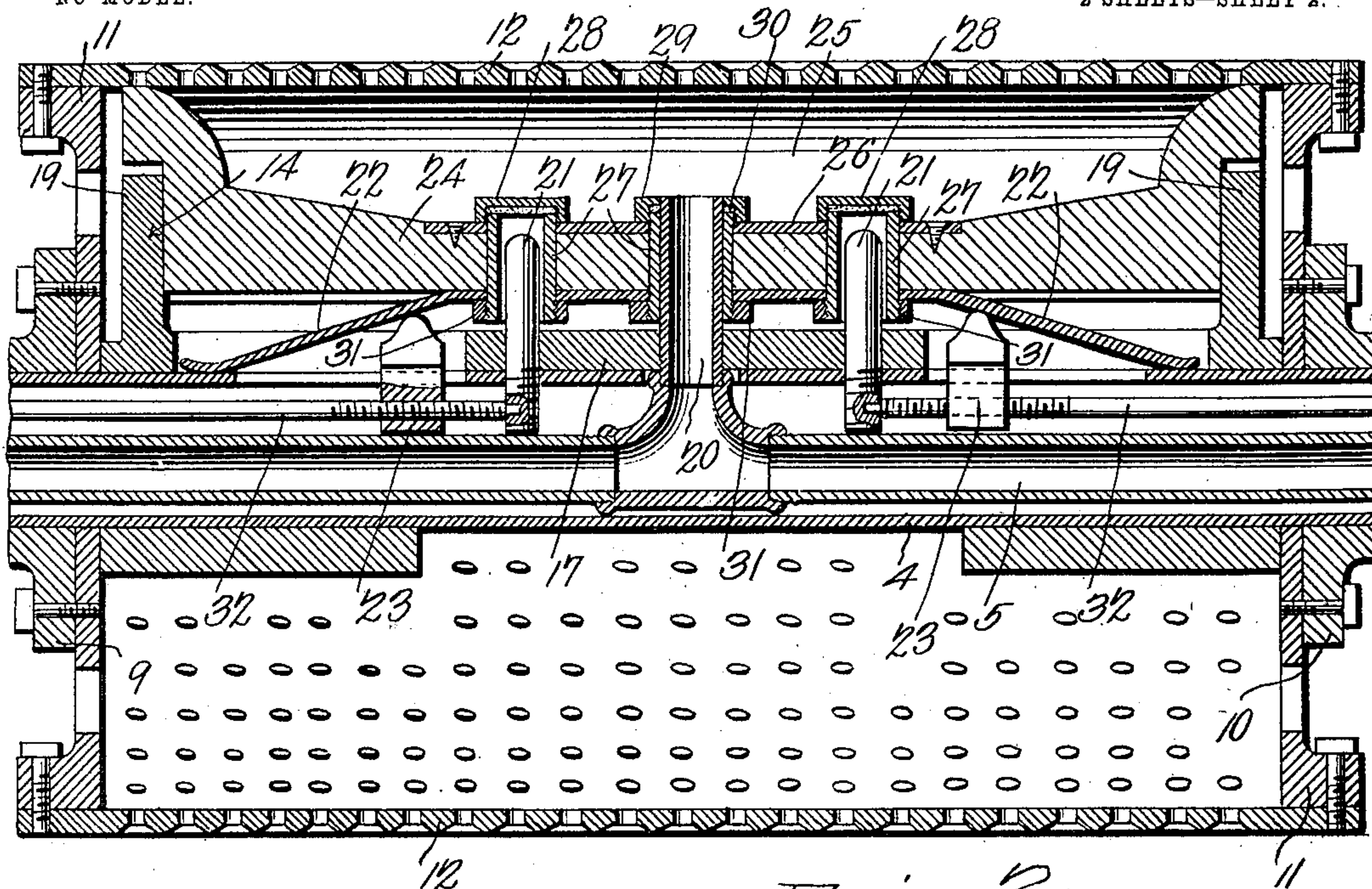


Fig. 2.

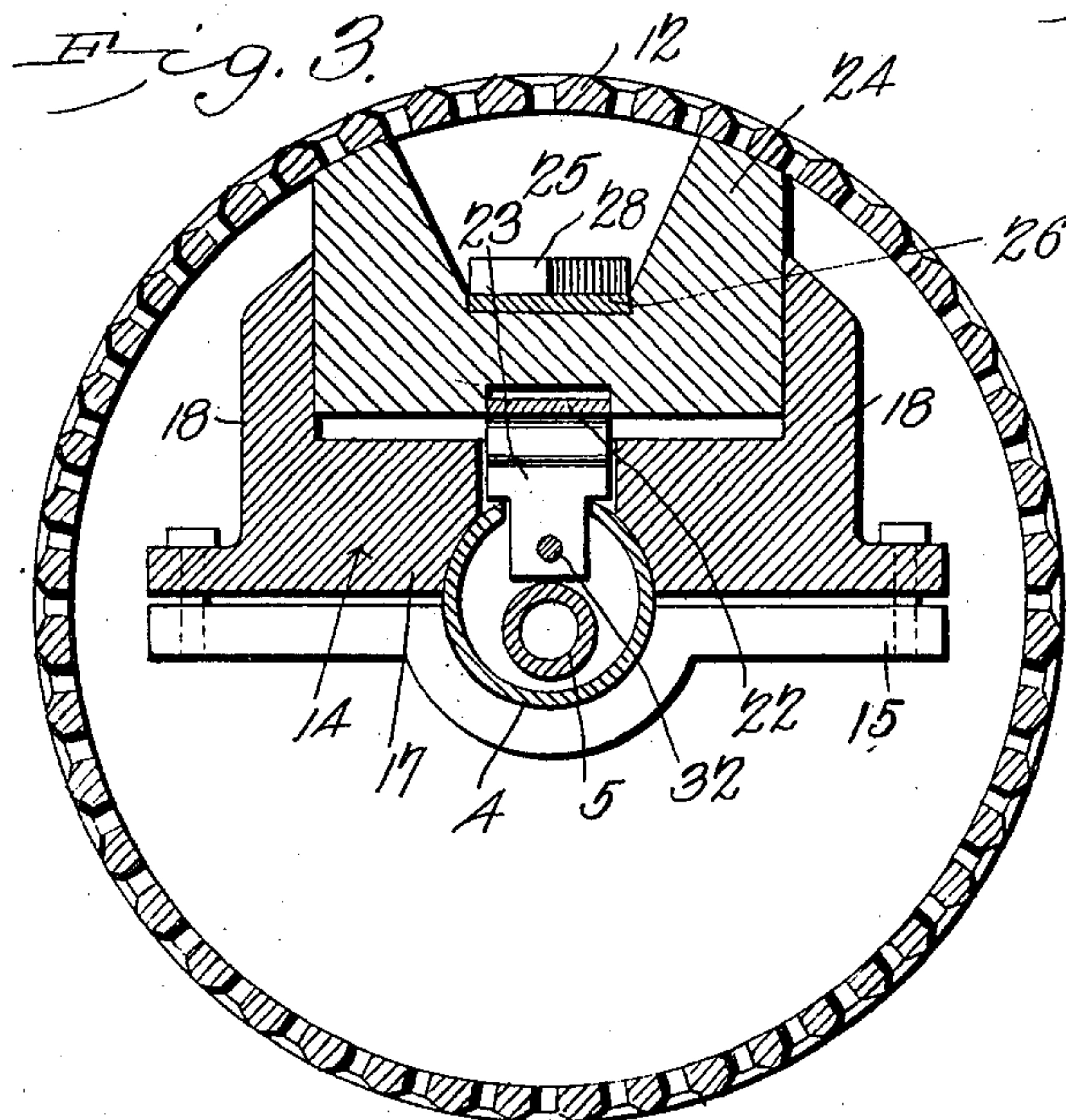


Fig. 3.

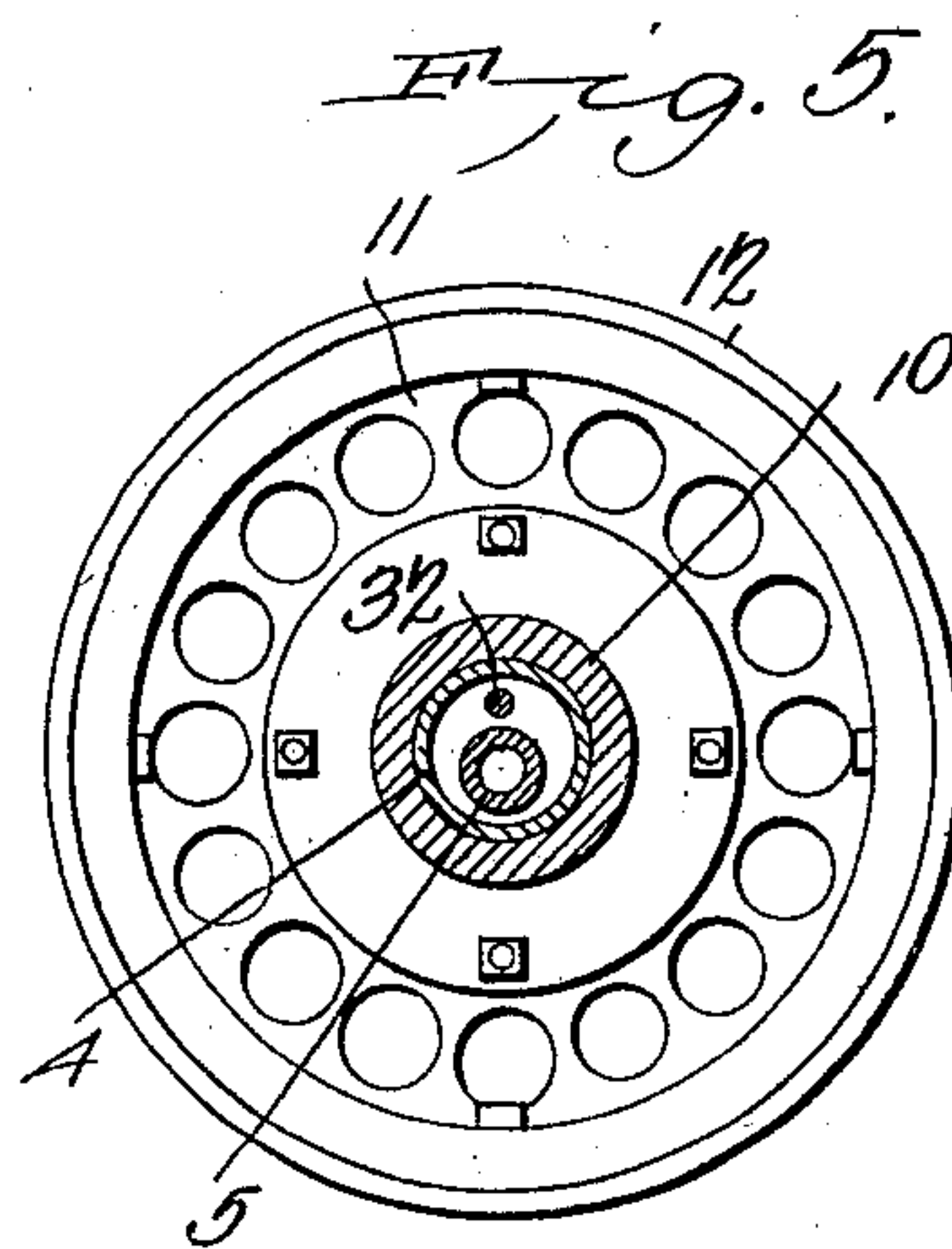


Fig. 5.

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SUCTION-BOX FOR PAPER-MAKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 754,036, dated March 8, 1904.

Application filed June 8, 1903. Serial No. 160,575. (No model.)

To all whom it may concern:

Be it known that I, EDWIN C. ANDREWS, a citizen of the United States, residing at Penn Yan, in the county of Yates and State of New York, have invented a new and useful Suction-Box for Paper-Making Machines, of which the following is a specification.

This invention relates to suction-boxes for paper-making machines.

The principal object of the invention is to provide a suction-box the outer portion of which is adapted for continuous movement at the same superficial speed as the wire or felt of a paper-making machine and the internal structure of which is adapted to remain at all times in air-tight contact with the outer moving portion of the suction-box.

Another object of the invention is to provide in suction-boxes for paper-making machines means for regulating the pressure of an internal suction-chamber against an outer rotary casing which lies in contact with the continuously-moving wire or felt of the paper-making machine.

Further objects contemplated in the invention are a simplification of the construction of devices of the type specified and the diminution of wear upon the parts thereof when in use.

With the objects above stated and others in view, which will appear as the invention is more fully disclosed, the same consists in the construction and combination of parts of a suction-box for paper-making machines hereinafter described, illustrated in the accompanying drawings, forming a part of this specification, and having the novel features thereof pointed out in the appended claims, it being understood that changes may be made in the form, proportions, and exact mode of assemblage of the elements exhibited without departing from the spirit of the invention or sacrificing any of its advantages.

In the drawings, Figure 1 is a view in vertical longitudinal section through the suction-box and its supports. Fig. 2 is a view in vertical longitudinal section through the suction-box, the rotary casing, and the associated structures, made on a larger scale than Fig. 1 to show the details of construction. Fig. 3 is a transverse section through the suction-box

and rotary casing on the line 3 3 of Fig. 1. Fig. 4 is a transverse section through the suction-box and rotary casing on the line 4 4 of Fig. 1. Fig. 5 is a transverse section on the line 5 5 of Fig. 1.

Corresponding parts are designated by the same characters of reference throughout the several views.

Referring to the drawings by reference characters, 1 1 are supporting-standards provided at their tops with journals 2 2 and collars 3 3.

4 designates a large tubular casing for the drainage-tube 5 and other structures hereinafter to be mentioned. The casing 4 is fixed in position in the collars 3 3 by means of clamping-screws 6 6. The casing 4 is closed at its ends by caps 7 7, clamped thereon by screws 8 8, as shown. Encircling the casing 4 near the ends thereof are sleeves 9 and 10, to which are bolted the heads 11 of a perforated cylinder 12, which forms the outer casing of the suction-box. Sleeves 9 and 10 are rotatable upon the casing 4 and are supported in the journals 2 2 above mentioned. Sleeve 9 is longer than sleeve 10 and is provided between the journal in which it is supported and the inner end, to which is attached one of the heads 11, with a pulley 13, rigidly associated therewith in order to impart motion to the sleeve when driven by suitable means.

The hollow cylinder 12 is provided with a large number of perforations extending through the wall thereof, as shown, the perforations being placed close together and being preferably countersunk at the outer surface of the cylinder so as to permit the suction to act upon as large a surface of the paper-making machine felt or wire as possible. Within the hollow cylinder 12 there is rigidly mounted upon the casing 4 a casting 14, securely held thereon by means of clamping-plates 15, bolted to the lower surface of the casting, as best seen in Fig. 3. The casting 14 is of rectangular form and comprises a bottom 17, side walls 18, and end walls 19. The bottom 17 is pierced at the middle thereof for the passage of a tube 20, which extends upward from the drainage-tube 5, and perforations are provided for the passage of two

guide-rods 21, which are threaded at their lower ends and are mounted in suitable openings provided for that purpose in the upper portion of the tubular casing 4. The bottom 5 17 of casting 14 is also slotted at either end thereof to permit the passage of springs 22 and adjusting-lugs 23. The springs 22 are secured to the bottom of a wooden reservoir 24, which is slidably mounted in the chamber formed in 10 the casting 14 and is held normally in contact at the top with the inner surface of the hollow cylinder 12, to contact with which the upper edges of said reservoir have been appropriately shaped. The wooden reservoir 24 is provided 15 on its upper surface with a depression 25, which forms the suction-chamber proper of the suction-box and into which the moisture extracted by suction by the paper-pulp passing above the suction-box is drawn. At the bot- 20 tom of the depression 25 is screwed a plate, of brass or iron, 26, through which extend three tubular casings 27. Each of said tubular casings 27 extends downward below the bottom of the reservoir and is secured in place by means 25 of a nut at the bottom and a nut or cap at the top. Casings 27, adjacent to the ends of the reservoir, are provided to permit the entrance into the bottom of the reservoir of the guide-rods 21 and are closed at the top by means 30 of imperforate caps 28. The central casing 27 permits the upward extension of tube 20 into the depression 25, which forms the suction-chamber proper, as already explained, and this casing is secured in position by 35 means of a nut 29, provided with an inwardly-projecting annular flange adapted to overlie the upper end of the casing and to contact with the outside of said tube 20. Between 40 the flange or nut 29 and the upper end of casing 27 is provided a gasket or washer 30, of rubber or other suitable packing material, which is clamped in position by the nut when screwed home on the casing and forms an air-tight joint between the tube 20 and the cas- 45 ings 27. At their lower ends the casings 27 are provided with nuts 31, which hold the casings securely in position and which also serve to clamp the springs 22 in firm contact with the under surface of the reservoir 24. 50 The springs 22, secured, as above explained, to the bottom of the reservoir 24, rest upon the tubular casing 4 and serve to hold the reservoir normally in contact with the inner surface of the hollow cylinder 12. As the 55 upper edges of the reservoir tend to wear away with the continued use of the apparatus, it is desirable that means should be provided to increase the pressure of said springs to compensate for the wear. This means com- 60 prises the lugs 23, which extend upward through slots provided in the bottom of the casting 14, and slots of somewhat narrower width provided in the upper surface of the tubular casing 4, immediately beneath the 65 slots in the casting 14. The lugs 23 have

shoulders resting upon the upper surface of the tubular casing 4 and narrow extensions which project downward into the interior of the casing 4. The lugs 23 are moved longi- 70 tudinally of the casing 4 by means of threaded rods 32, each of which has one end journaled in one of the guide-rods 21 and the other end journaled in one of the caps 7, which close the ends of the tubular casing 4. The rods 32 are held against longitudinal movement within 75 the casing 4 and are provided at their outer ends with nuts 33, which afford a ready grip for an ordinary wrench which may be used to rotate said rods. Rods 32 extend through and engage with threaded openings in the 80 downward extensions of lugs 23, and consequently any rotary movement of one of the rods 32 will impart a certain amount of longitudinal movement to lug 23, with which it engages. 85

When the suction-box is used in a paper-making machine, the standards 1 are so placed that the paper-making machine wire or felt will travel over the upper portion of hollow cylinder 12 and will remain in contact there- 90 with over a space at least as large as the top of the reservoir 24. Motion is imparted to the pulley 13 from any suitable source, so that the hollow cylinder 12 may be made to rotate with a superficial speed exactly equal to the 95 speed of longitudinal movement of the paper-making machine wire or felt. Suction is then applied to either or both ends of the drainage-tube 5, it being of course understood that if suction is applied at one end only the other 100 end must be closed. When this is done, the air within the depression 25 of the reservoir 24 is reduced in tension and the moisture is withdrawn from the wet paper-pulp passing over the reservoir. The moisture so extracted 105 passes down into the depression 25 and thence through tube 20 and drainage-tube 5 to any suitable point of escape. As the upper edges of the reservoir 24 wear gradually away by continued contact with the inner surface of 110 the rotary cylinder 12, the wear is compensated for by rotating the shafts 32 and causing the adjusting-lugs 23 to move outwardly toward the ends of the hollow cylinder 12, thereby raising the ends of springs 32 and increasing 115 the pressure of the reservoir against the inner surface of the hollow cylinder 12. As the reservoir moves upward from the bottom of casting 14 the tube 20 has a slight relative downward movement through the nut 29 and the packing-washer 30, but there is no result- 120 ing entry of air into the reservoir between the casings 27 and tube 20.

In a suction-box constructed in the manner above described it will be clearly seen that the 125 contact of the reservoir with the inner surface of the hollow cylinder 14 may be easily adjusted at any time to secure an air-tight joint and at the same time to avoid unnecessary friction and wear. It will also be noted that 130

owing to the fact that the reservoir is supported on springs it is held yieldably in contact with the inner surface of the hollow cylinder 12, and any irregularities in the cylinder-wall or any eccentricity of the cylinder with reference to its journals will not materially interfere with the operation of the apparatus. It will also be observed that in the construction of the suction-box above described the number of parts employed has been made unusually small for such devices and that except on the edges of the reservoir, which is held in frictional contact with the inner surface of the rotary cylinder, there will be practically no wear on the working parts.

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

1. The combination in apparatus of the class described, of a hollow rotatable cylinder having perforations in the side wall thereof, a non-rotative suction-chamber within said cylinder, a stationary supporting member extending through said cylinder and having portions thereof adjustable in position, and resilient members attached to said chamber and resting upon the adjustable portions of said supporting member, said resilient members serving to hold said chamber in contact with the inner surface of said cylinder.

2. The combination in apparatus of the class described, of an endless perforated septum adapted to travel in contact with the under surface of a paper-making machine wire or felt, a supporting member fixed in position beneath said septum, guides on said supporting member, a suction-chamber slidably mounted on said guides, springs attached to said suction-chamber and engaging said supporting member to hold said chamber in contact with said septum, and means for varying the upward pressure of said springs.

3. The combination in apparatus of the class described, of an endless perforated septum adapted to travel in contact with the under surface of a paper-making machine wire or felt, a supporting member beneath said septum having movable portions, a suction-chamber, guides upon said supporting member upon which said suction-chamber is mounted, leaf-springs attached to the bottom of said suction-chamber and having the free ends thereof resting upon the movable portions of said supporting member, and serving to hold said suction-chamber in yielding contact with said septum, and means for shifting the movable portions of the supporting member.

4. The combination in apparatus of the class described, of an endless perforated septum adapted to travel in contact with the under surface of a paper-making machine wire or felt, a supporting member beneath said septum, guides provided on said supporting member, a suction-chamber slidably mounted on

said guides, leaf-springs attached to the bottom of said suction-chamber, and having the free ends thereof resting normally upon said supporting member, adjusting-lugs slidably mounted upon said supporting member beneath said springs, and means for shifting the position of said lugs to raise the free ends of said springs.

5. The combination in apparatus of the class described, of an endless perforated septum adapted to travel in contact with the under surface of a paper-making machine wire or felt, a supporting member beneath said septum, guides provided on said septum, a suction-chamber slidably mounted on said guides, leaf-springs attached to the bottom of said suction-chamber and having their free ends resting normally upon said supporting member, adjusting-lugs slidably mounted on said supporting member beneath said springs, and means comprising rotative threaded rods provided in said supporting member and engaging threaded openings in said lugs for shifting said lugs upon said supporting member.

6. The combination in apparatus of the class described, of an endless perforated septum adapted to travel in contact with the lower surface of a paper-making machine wire or felt, a supporting member beneath said septum, a frame rigidly mounted on said supporting member, a suction-chamber vertically slidable in said frame, leaf-springs attached to the bottom of said suction-chamber and having their free ends inclined outwardly and downwardly and resting normally upon said supporting member, slots in the bottom of said frame under said springs, lugs slidable in said slots, and means for moving said lugs in said slots.

7. The combination in apparatus of the class described, of a rotatable hollow cylinder having perforations in the sidewall thereof, a tubular supporting member upon which said cylinder is mounted to rotate, guide-standards upon said tubular supporting member, a frame carried by said supporting member, a suction-chamber slidable on said standards and in said frame, leaf-springs attached to the bottom of said chamber and having their free ends inclined outwardly and downwardly to rest upon said supporting member, lugs slidable in said slots and adapted to engage said springs, and means for moving said lugs longitudinally of said slots.

8. The combination in apparatus of the class described, of a tubular supporting member, a hollow cylinder having perforations in the side wall thereof rotatably mounted on said supporting member, a frame clamped on said supporting member, a suction-chamber slidably mounted in said frame and yieldably held in contact with the inner surface of said hollow cylinder, a drainage-tube extending longitudinally through said supporting member, a side tube opening into said drainage-tube

and extending upward through the bottom of
said frame and said suction - chamber, and
means for maintaining air - tight contact be-
tween said side tube and the walls of the open-
5 ing in the bottom of said suction - chamber
through which said tube passes.

In testimony that I claim the foregoing as

my own I have hereto affixed my signature in
the presence of two witnesses.

EDWIN C. ANDREWS.

Witnesses:

H. C. ANDREWS,

A. W. FRANKLIN