

No. 881,879.

PATENTED MAR. 10, 1908.

C. W. E. BOEGEL.
SUCTION NOZZLE.

APPLICATION FILED OCT. 28, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

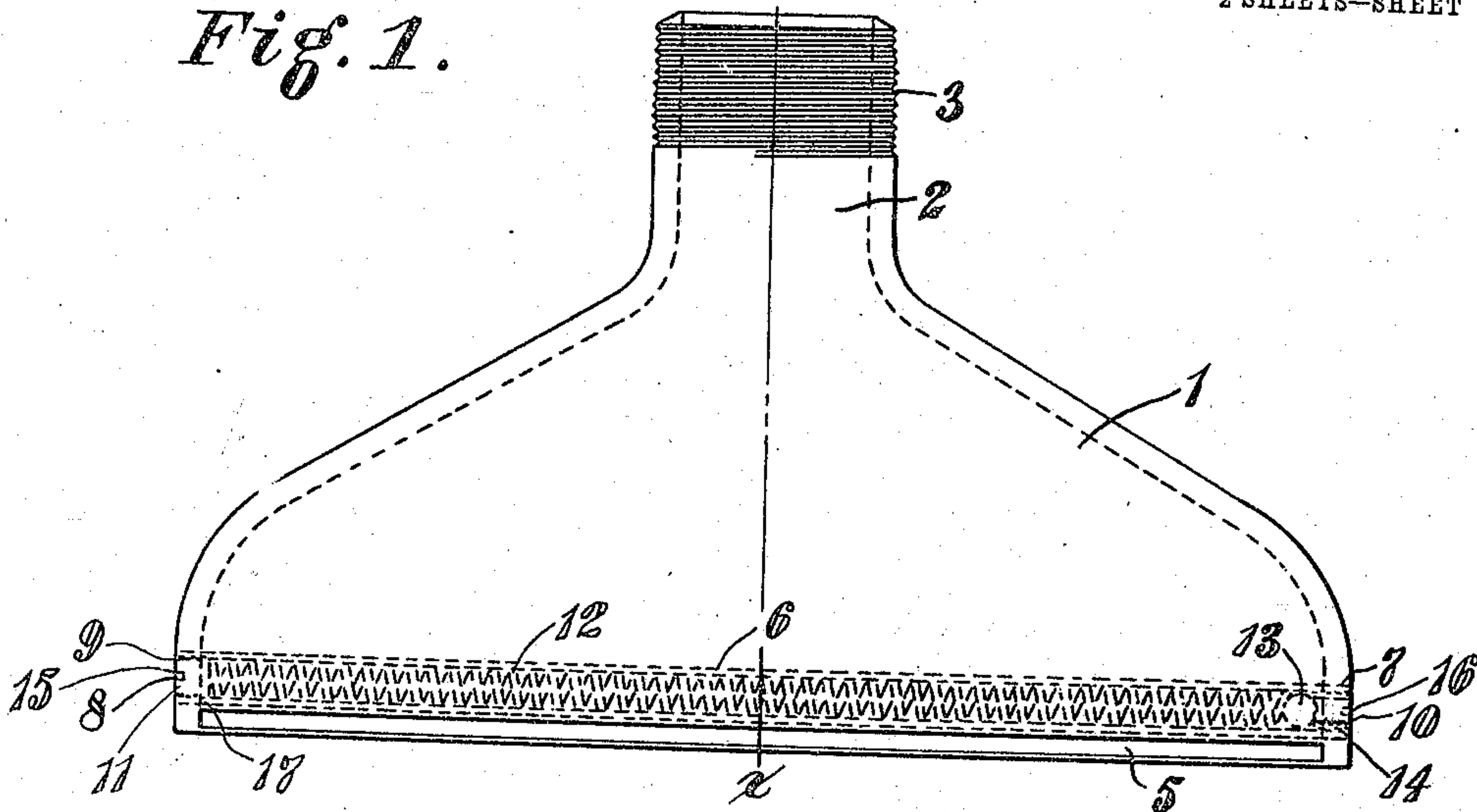


Fig. 2.

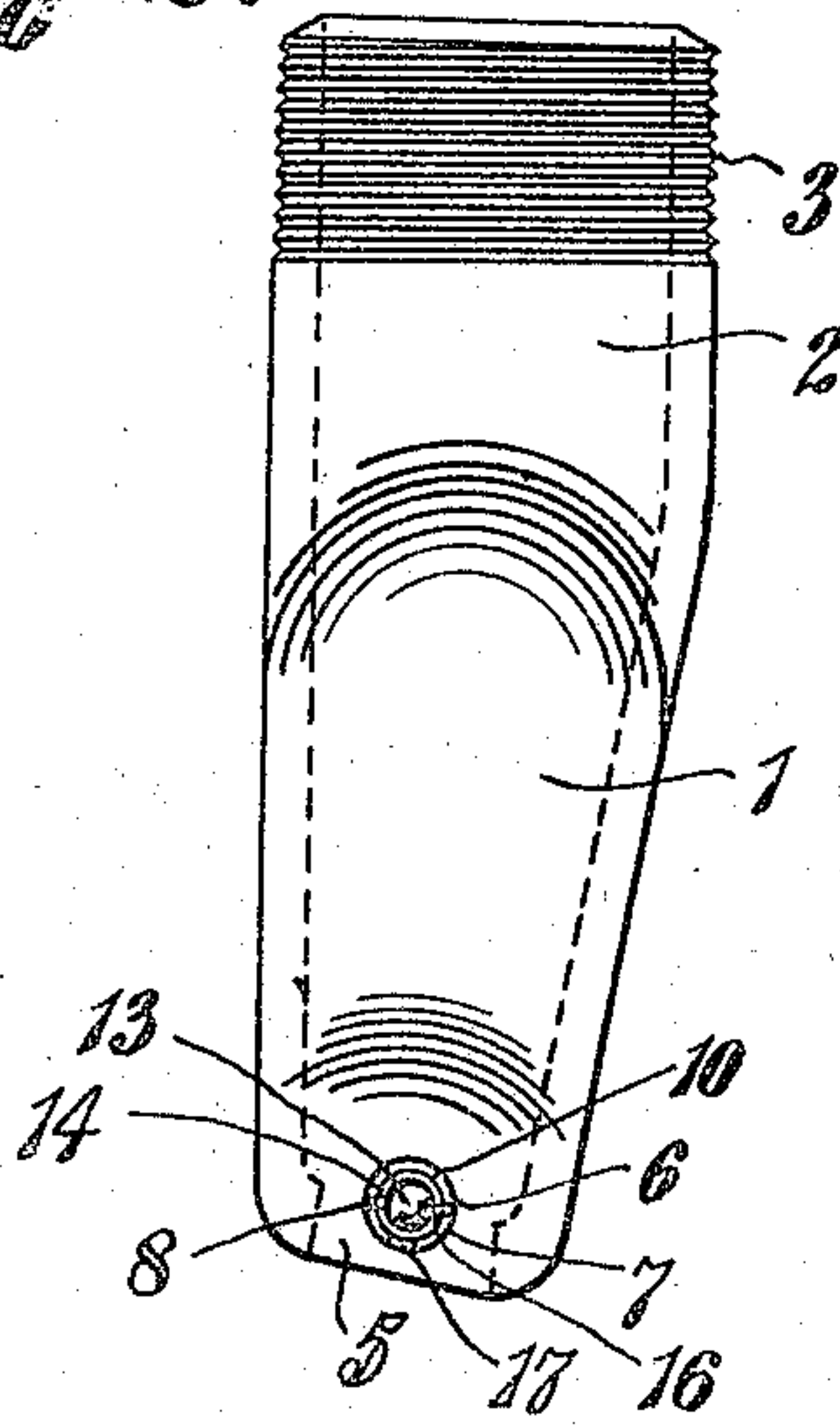


Fig. 3.

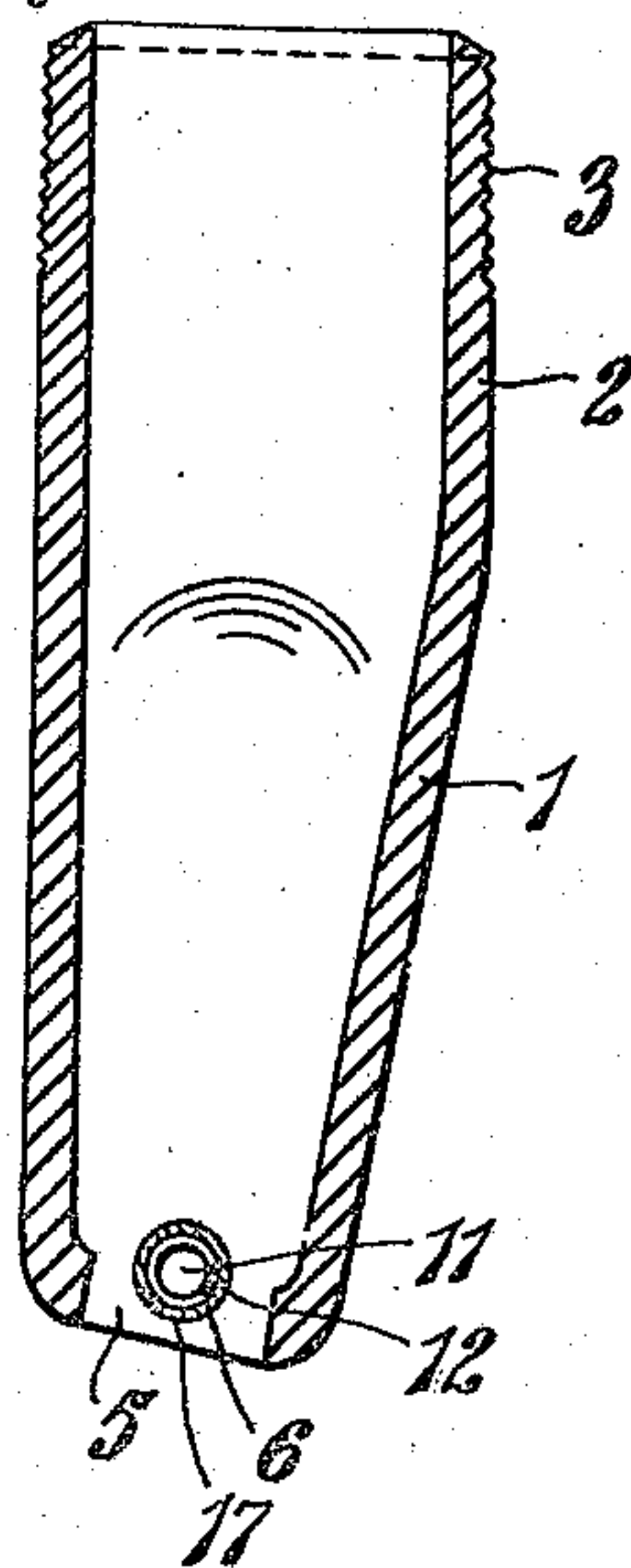
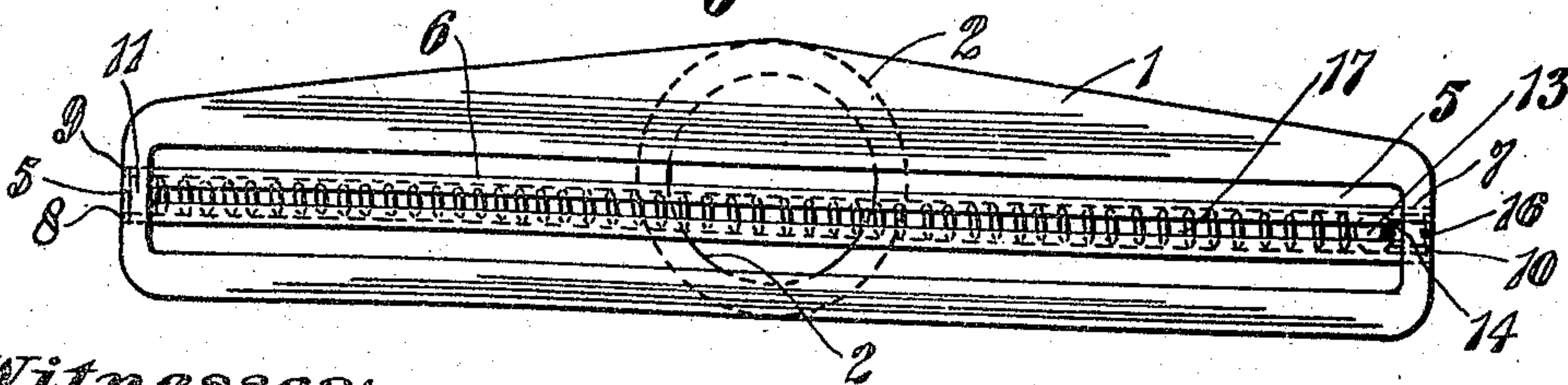


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 5.

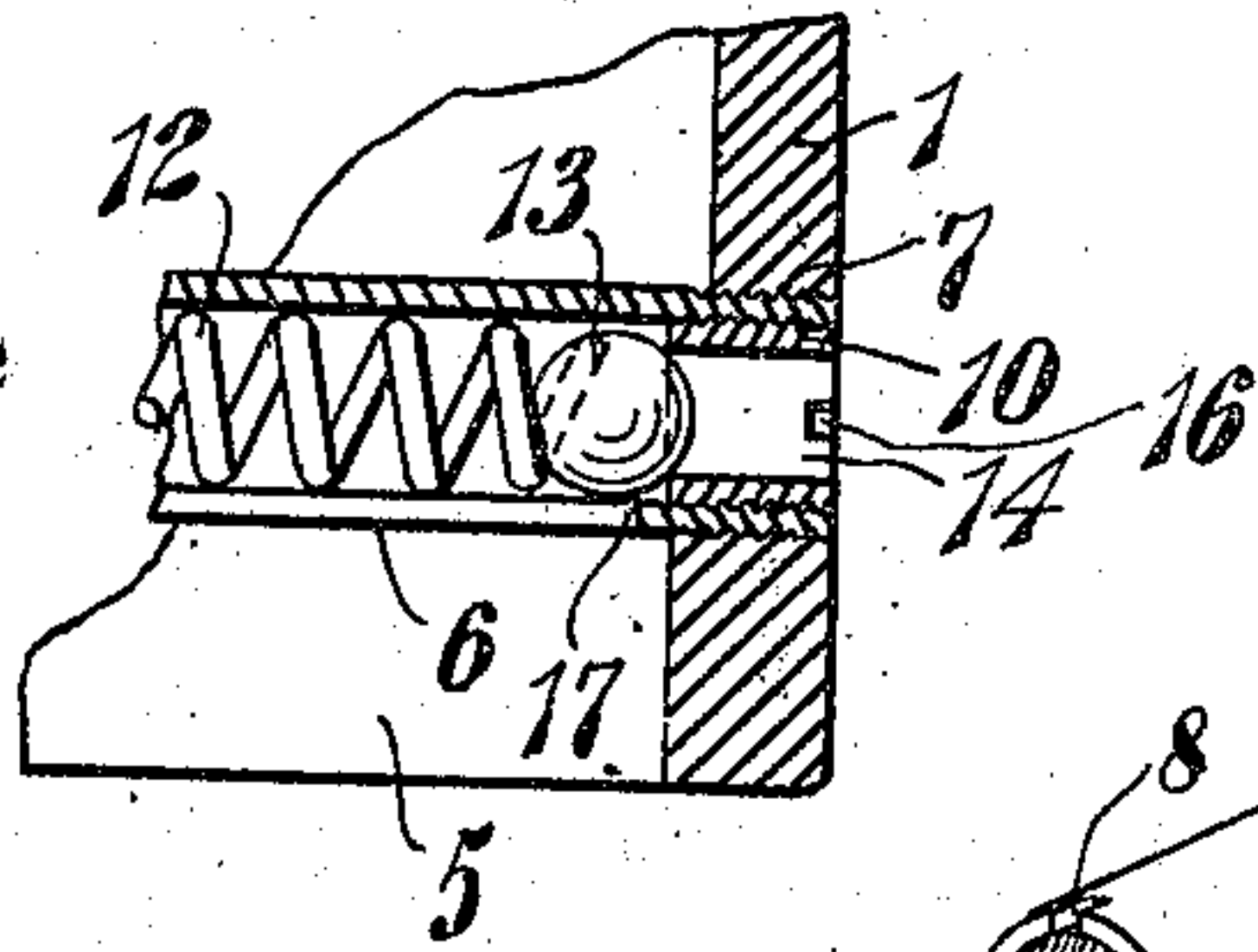
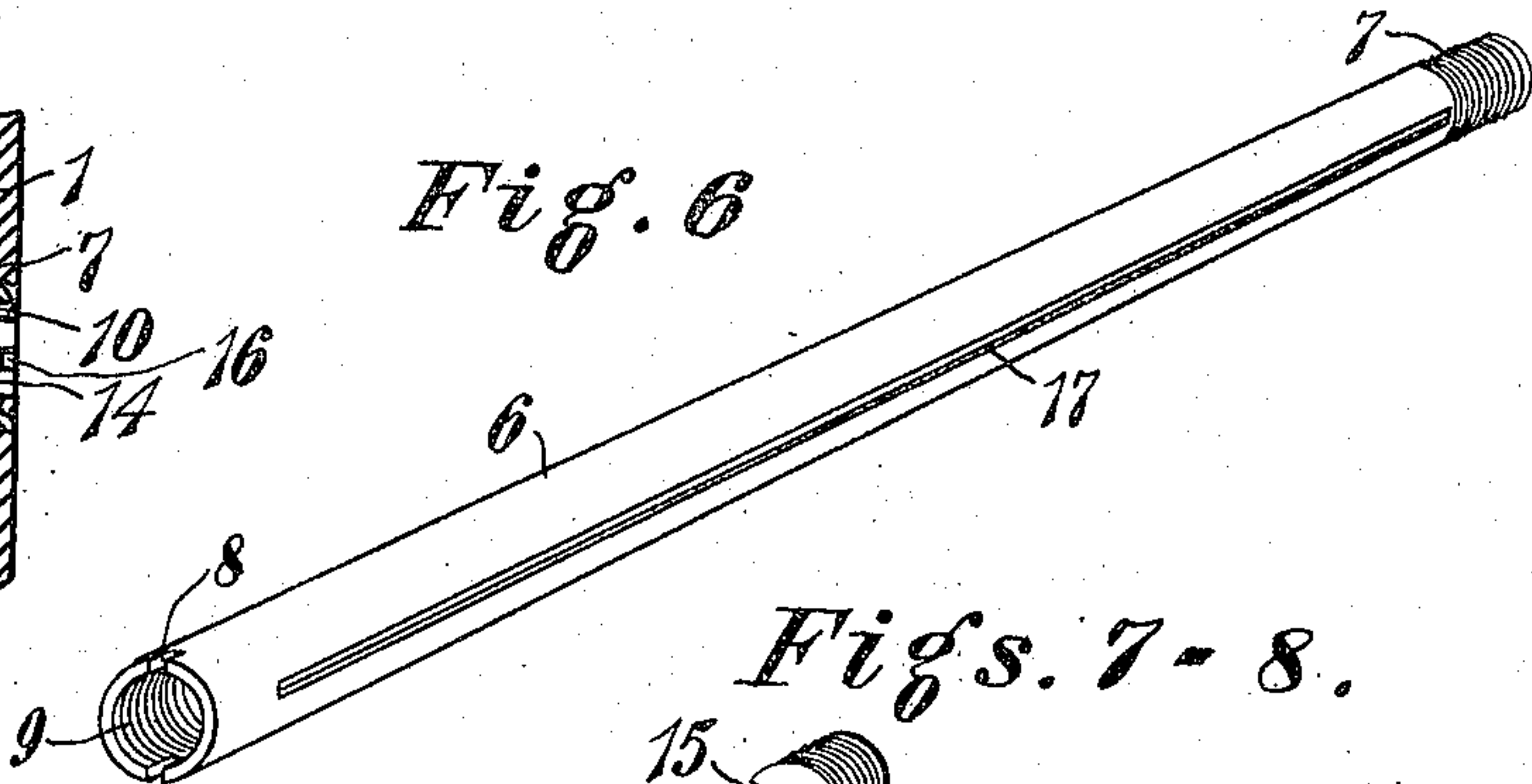


Fig. 6.



Figs. 7-8.



Fig. 12.

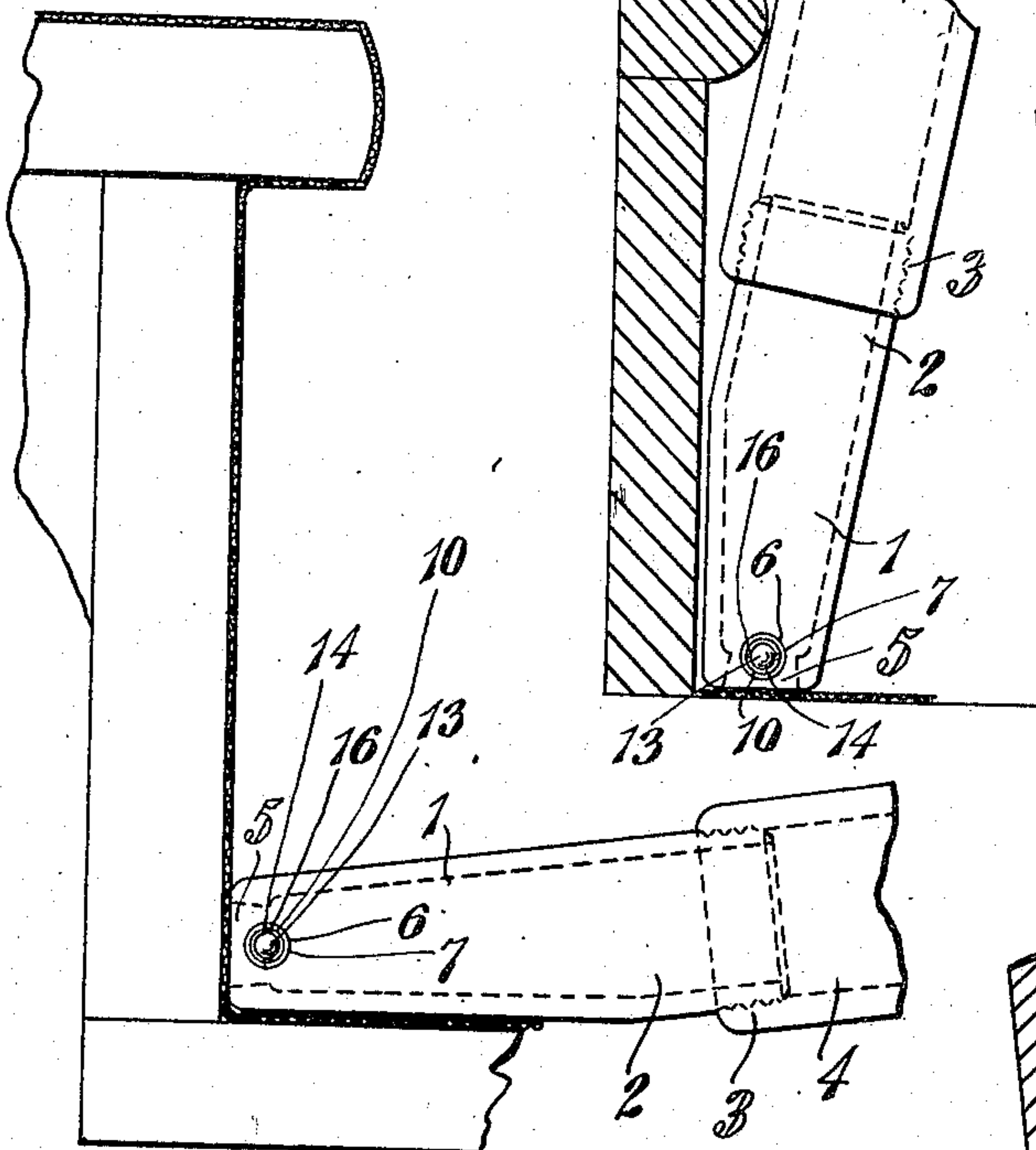


Fig. 11.

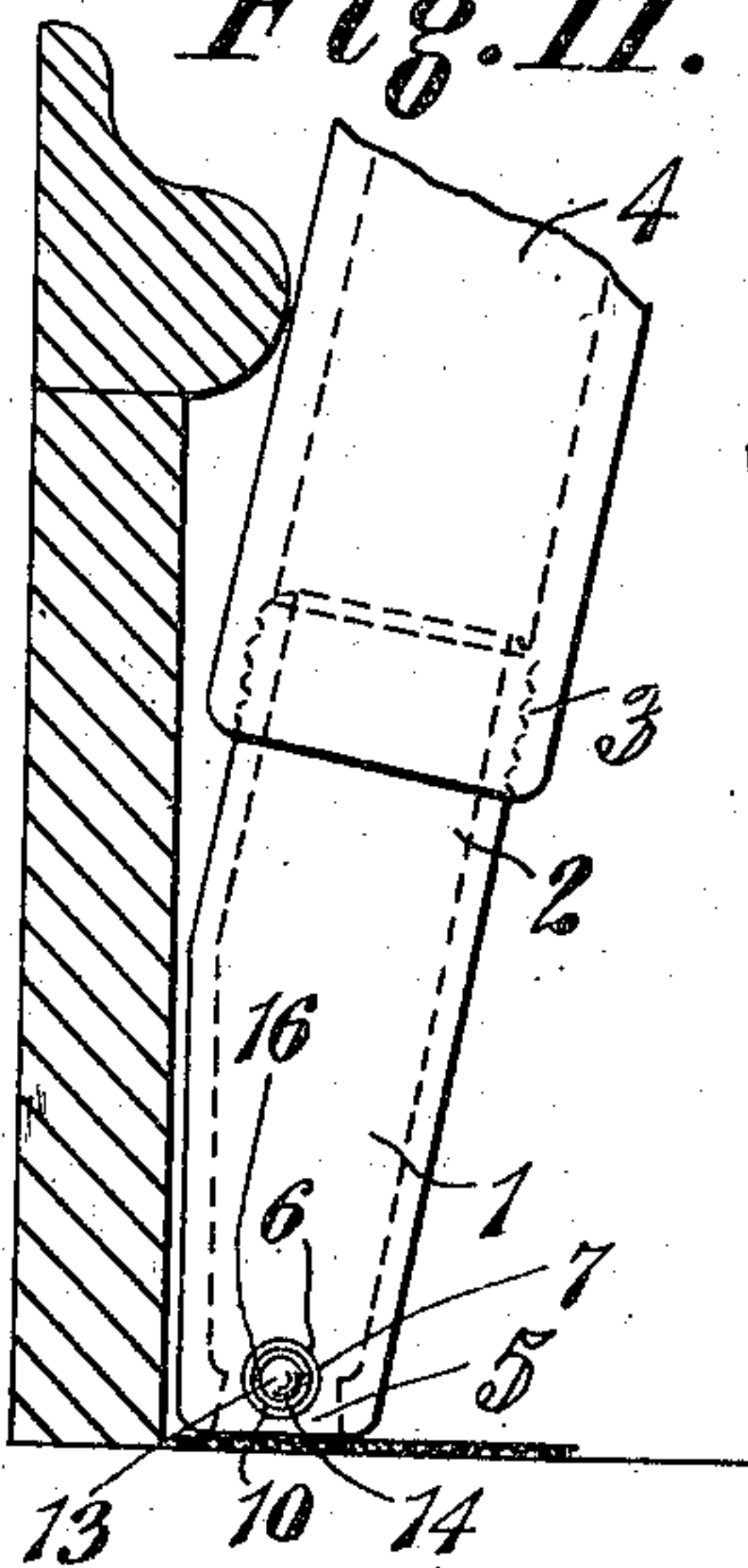


Fig. 9.

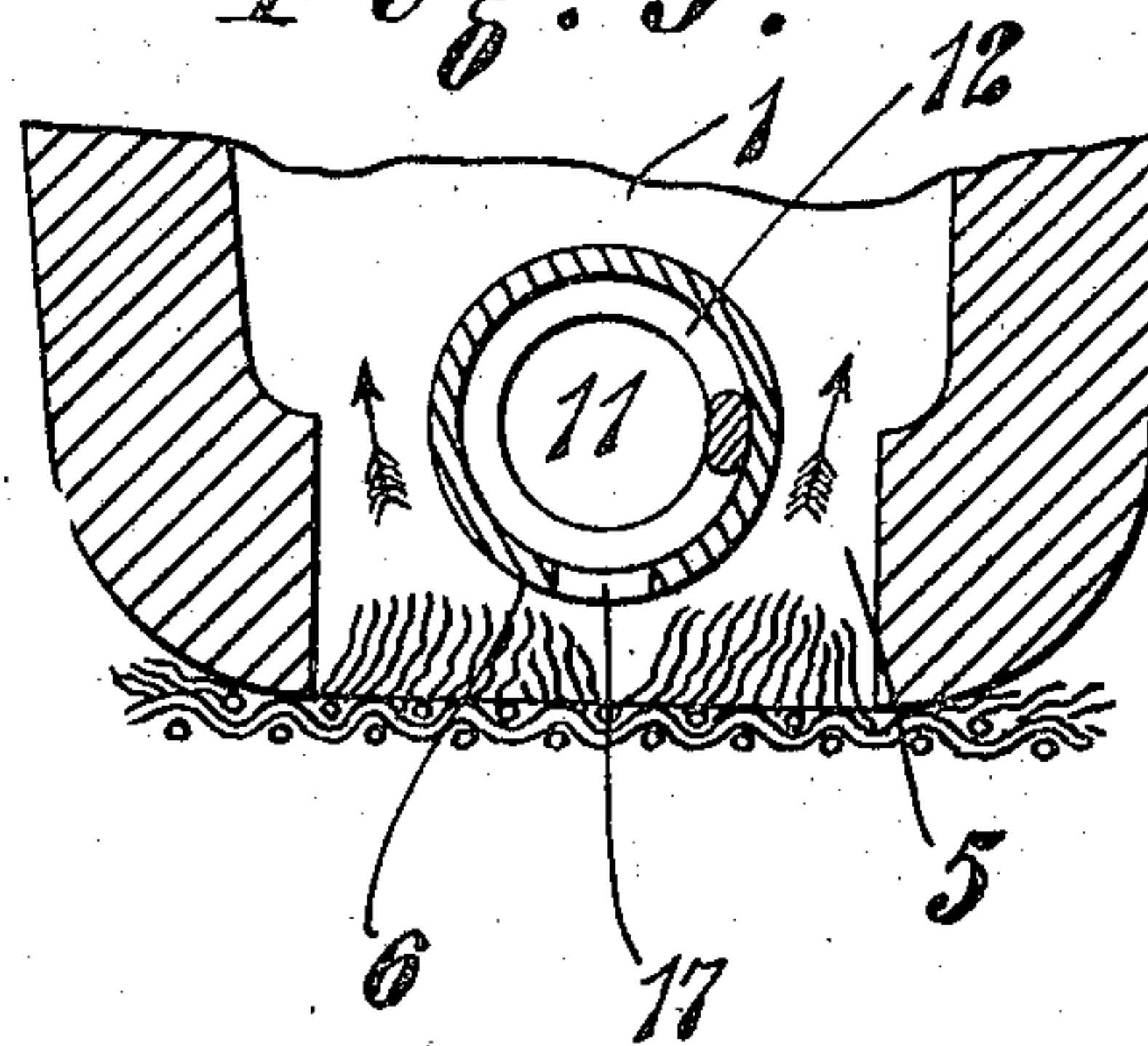
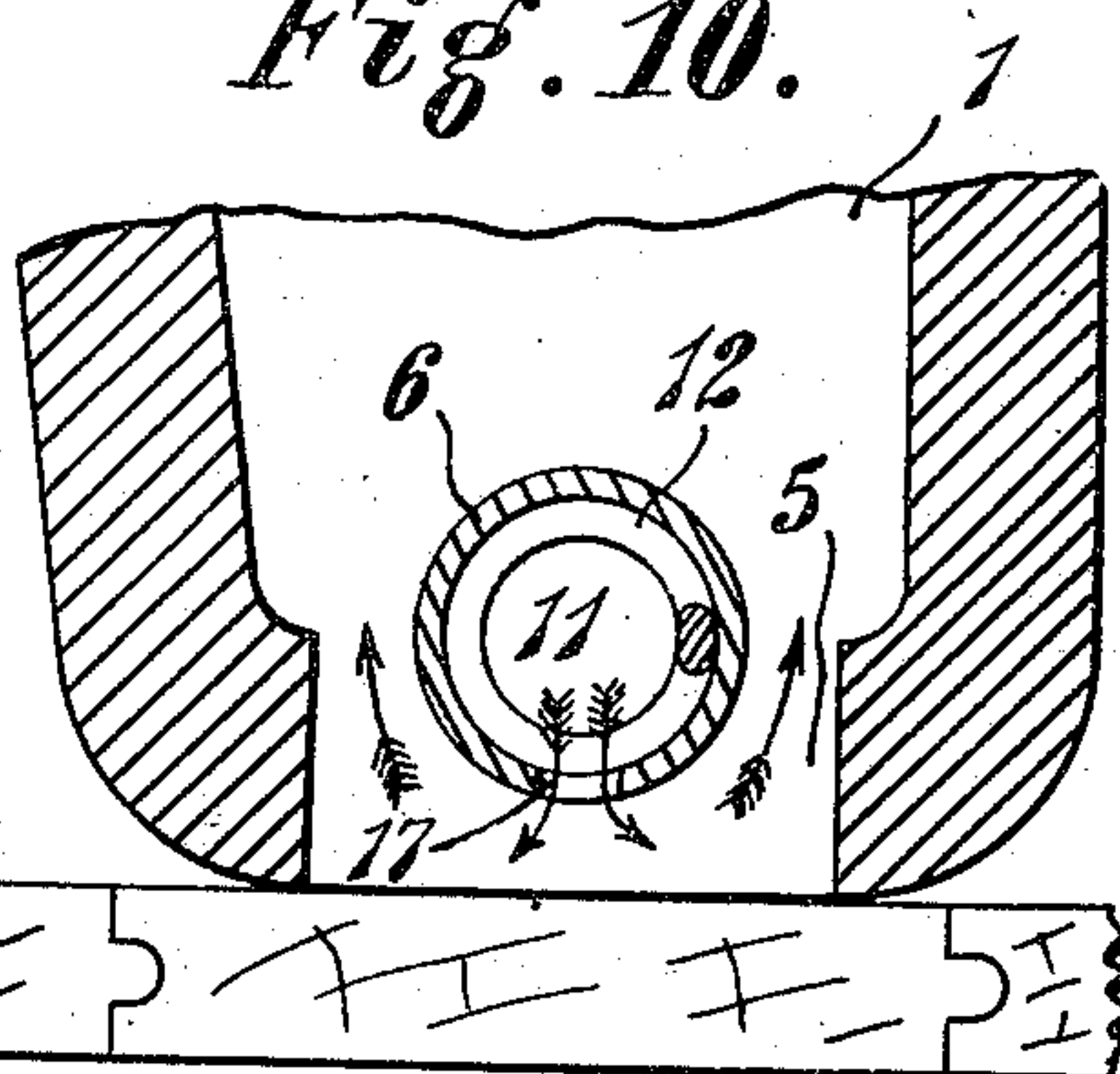


Fig. 10.



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UNITED STATES PATENT OFFICE.

CARL W. E. BOEGEL, OF LIMA, OHIO.

SUCTION-NOZZLE.

No. 881,879.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed October 28, 1907. Serial No. 399,419.

To all whom it may concern:

Be it known that I, CARL W. E. BOEGEL, a citizen of the United States, residing at Lima, in the county of Allen and State of Ohio, have
5 invented certain new and useful Improvements in Suction-Nozzles, of which the following is a specification.

My invention relates to carpet cleaning apparatus, the object being to render the
10 operation of the apparatus uniformly efficient, regardless of the nature of the surface being operated upon, as well as to admit of operation upon vertical surfaces and in corners with the greatest facility.

15 My invention consists in a casing having means for suitably connecting it to a suction or vacuum producing apparatus and provided with an elongated opening, longitudinally of which extends a slotted tube adapted to
20 form the means of communication between the interior of the casing and the atmosphere, independently of the elongated opening, said tube being provided with a relief valve adapted to be automatically operated by the
25 pressure of the atmosphere.

My invention also consists in the parts and in the details of arrangement and construction of parts as will hereinafter be more fully described and claimed.

30 In the drawings:—Figure 1 is a rear elevation of a device embodying my invention. Fig. 2 is a side elevation of same. Fig. 3 is a section on the line *x—* of Fig. 1. Fig. 4 is a bottom plan view of the device. Fig. 5 is a
35 sectional view of part of the device, more clearly illustrating the valve mechanism. Fig. 6 is a detail perspective view of the slotted tube. Figs. 7 and 8 are detail perspective views of the closed plug and the open
40 plug, respectively. Fig. 9 is a sectional view of part of the device, illustrating its operation on material of open texture. Fig. 10 is a similar view illustrating the operation of the device on a solid closed surface. Fig. 11
45 is a view illustrating the adaptability of the device for working close to the wall under a projecting base-board cap. Fig. 12 is a view illustrating the adaptability of the device for cleaning on vertical surfaces.

50 As I prefer to construct my invention, the casing 1 is of elongated lower formation, tapering to a circular nipple 2 which is provided with screw threads 3, adapting it for connection with a suitable conducting pipe 4,
55 as shown in Figs. 11 and 12, whereby it may communicate with a suction or vacuum pro-

ducing apparatus not herein shown or described since it does not constitute part of my invention. As will be noted, the general direction of the lower elongated part of the casing is at an angle to the direction of the nipple 2, this angle better adapting the device for use in corners and on vertical surfaces, while the elongation of the lower part is such that a comparatively long and narrow opening 5 may be employed in the lower side of the casing, thus further adapting the device for working closely into the corners.

As the openness of texture of the material upon which the device is operating varies, the available opening for the inlet of air to the casing through the material will also vary when the casing is maintained in close contact with the material being operated upon. In order to maintain a practically uniform inflow of air to the casing, and consequently a practically uniform efficiency of operation, I provide the tube 6 extending longitudinally of the elongated opening 5 and in the middle thereof. This tube 6 is preferably secured in the casing at one end by means of screw threads 7 and is provided at its other end with a slot 8 for facilitating screwing the tube in position. This tube 6 has internal threads 9 and 10 at the ends. As shown, the device is provided with only one automatic valve, and the threads 9 receive the closed plug 11. Within the tube 6, and abutting against the closed plug 11 with one of its ends, is the spiral spring 12. This spiral spring 12 bears at its other end against a ball 13 of slightly less diameter than the interior of the tube 6, and this ball 13 is pressed by the spiral spring 12 against the open plug 14, which is received by the internal threads 10 of the tube 6. The ball 13 thus forms the gate for the relief valve. The closed plug 9 and the open plug 10 are provided with slots 15 and 16, respectively, to facilitate screwing them in position. The lower side of the tube 6 is provided with the longitudinal slot 17 extending substantially the full length of the elongated opening 5.

The length of the spiral spring 6 is so proportioned that when the device is operating upon a surface of sufficiently open texture to accommodate the full inflow of air incident to the vacuum produced in the casing 1, the ball 13 will be pressed tightly against the inner end of the open plug 10, which inner end forms a seat for the valve. However as soon as the device begins to operate on a sur-

face of insufficiently open texture to accommodate the inflow of air required, the ball 13 will be pressed inward against the pressure of the spiral spring 6 by the atmosphere, this inward movement of the ball 13 being proportionate to the deficiency of inflow through the material being operated upon. The ball 13 being of less diameter than that of the interior of the tube 6, the air entering through the valve will flow around the ball and out of the tube downward through the longitudinal slot 17, impinging upon the surface of the material being operated upon, and from there being drawn upward around the sides of the tube 6 as a result of the vacuum produced in the upper part of the casing 1. This is best illustrated in Fig. 9 of the drawings. The tube 9 is placed a sufficient distance above the lower edges of the elongated opening 5 to avoid interference with the rising of the nap of the material being cleaned, as is best illustrated in Fig. 10 of the drawings.

As will be readily understood, when so desired, relief valves may be provided at both ends of the tube 6 by merely inserting a duplicate of the ball 13, and substituting a duplicate of the open plug 14 for the closed plug 11, the threads 9 and 10 being alike, so that the open and closed plugs may be interchanged at will. The device, thus constructed, automatically adapts itself to any surface upon which it may be required to operate by allowing a substantially constant impingement of air against the fibers of the material either directly through the material when the material is of open texture, or partially through the material and partially against the upper fibers of the material when the texture is only moderately close, or entirely against the upper surface when the material is entirely closed against the passage of air. This constant flow of air not only renders the device more efficient, in that it produces a constant removal of dust particles from the fibers of the material or from the surface of the material, as the case may be, but in that it obviates the difficulty caused by the nozzle clamping itself to the surface of the material when no automatic relief valve is provided. A certain velocity of air through the outlet and discharge tubes is necessary in order to prevent clogging of the dust particles, and it is desirable that this velocity be substantially constant. As the device above described allows of this substantial constant velocity, it will be seen that the clogging of the dust particles in the outlet and discharge tubes is avoided. While the device is constructed and provided with the relief valve as above described, thus rendering it more efficient and more easily operated, regardless of the nature of the surfaces upon which it is being used, the compactness of construction allowed by the com-

paratively long and narrow opening, the absence of projecting parts on the outside of the nozzle and the formation of the device in general leaving an unobstructed outer surface, permit of easy access to any corners or surfaces where it is desirable to use it. The device is thus adapted for cleaning carpets, upholstered furniture, draperies, wall hangings and a variety of other articles requiring the removal of dust and impurities, the cleansing being permitted without removing the articles from the positions in which they are used.

While I have shown and described a device having the shape and having the relief valve in position for use under most conditions, I do not wish to be understood as limiting myself to it, but

What I claim as new and desire to secure by Letters Patent is:

1. In a suction nozzle, a casing having an elongated opening therein, a slotted tube extending longitudinally of said elongated opening, and a valve in said slotted tube adapted to be automatically opened by the pressure of the atmosphere, substantially as and for the purposes specified.

2. In a suction nozzle, a casing of elongated lower formation and of tapering upper formation, adapted to communicate with a suction or vacuum producing apparatus, an opening extending longitudinally of the lower part of said casing, a tube extending longitudinally thereof, coincident with said opening, a valve seat near the end of said tube, and a spring controlled gate adapted to engage with said valve seat or be disengaged therefrom by the pressure of the atmosphere, substantially as and for the purposes specified.

3. In a suction nozzle, a casing, an opening in said casing, a tube in said casing adapted to form communication between the interior of said casing and the atmosphere, independently of said opening, and an automatic relief valve in said tube, said opening being relatively long and narrow and said tube extending longitudinally of said opening, substantially as and for the purposes specified.

4. In a suction nozzle, a casing having an elongated lower part and a tapering upper part, the general directions of said upper and lower parts being inclined to each other, and said elongated lower part being provided with an opening extending longitudinally thereof, a slotted tube extending longitudinally of said opening, and an automatic relief valve in said tube, substantially as and for the purposes specified.

5. In a suction nozzle, a casing having an elongated lower part and a tapering upper part, means for communication between said casing and a suction or vacuum producing apparatus, an opening extending longitudinally of the elongated lower part, a slotted

5 tube extending longitudinally of said opening, an automatic relief valve in said tube, the tube being at some distance above the plane of said opening, substantially as and for the purposes specified.

10 6. In a suction nozzle, a casing, means for communication between said casing and a suction or vacuum producing apparatus, an opening in said casing for the inflow of air, a tube coincident with said opening and adapted to form means for communication between the interior of said casing and the atmosphere independently of said opening, and an automatic relief valve in said tube, substantially as and for the purposes specified.

15 7. In a suction nozzle, a casing having an elongated opening therein, a slotted tube extending longitudinally of said elongated opening; an open plug secured in the end of said tube, whereby a valve seat is formed, a

ball in said tube of slightly less diameter than that of the interior of said tube, a spiral spring in engagement with said ball, and means for confining said spiral spring, substantially as and for the purposes specified. 25

8. In a suction nozzle, a casing of elongated lower formation and tapering upper formation, an elongated opening in the lower part of said casing, a tube extending longitudinally of said elongated opening, and a relief valve in said tube, the mechanism of which is contained entirely within said tube, whereby said casing presents an unobstructed outer surface, substantially as and for the purposes specified. 30

CARL W. E. BOEGEL.

Witnesses:

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