

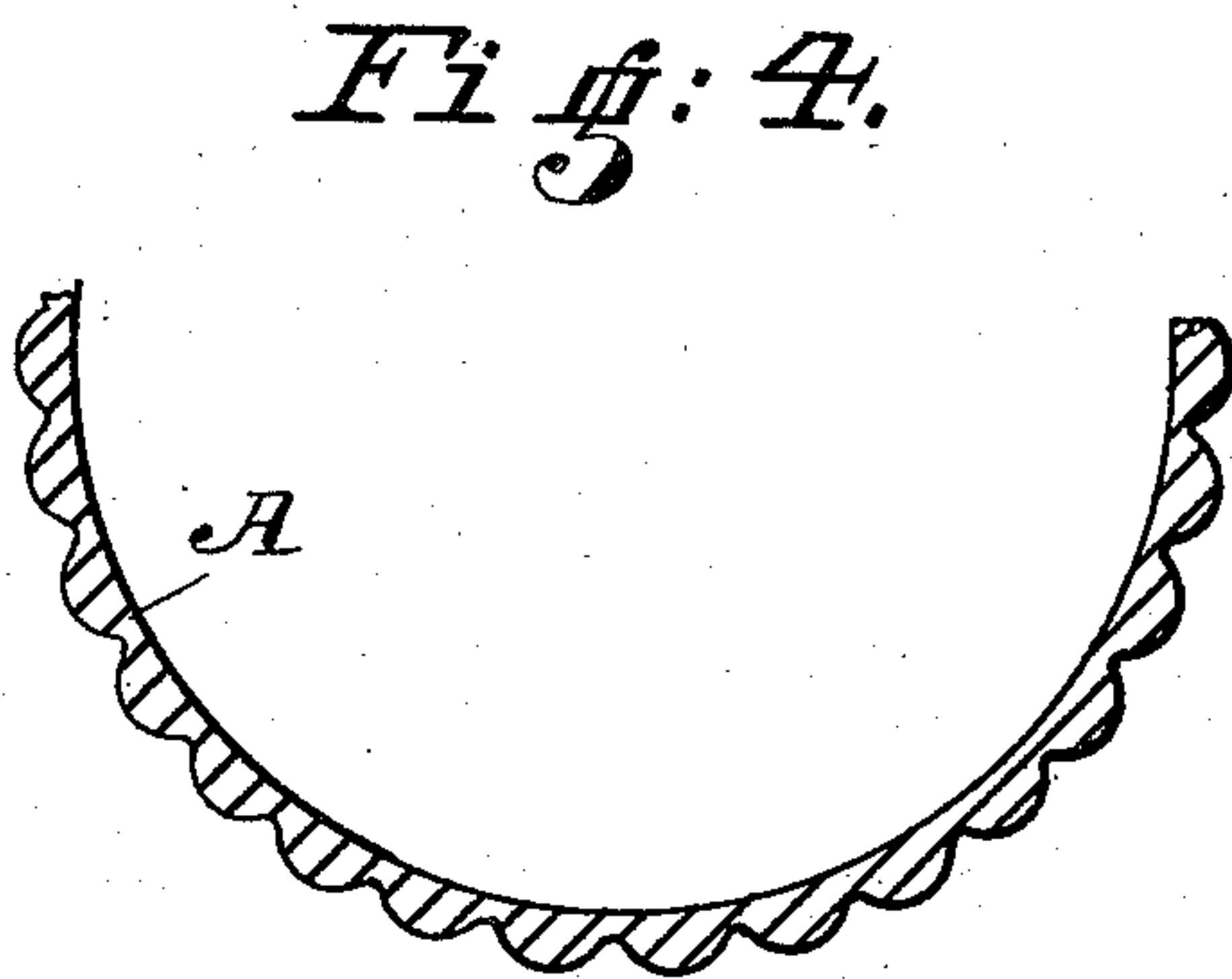
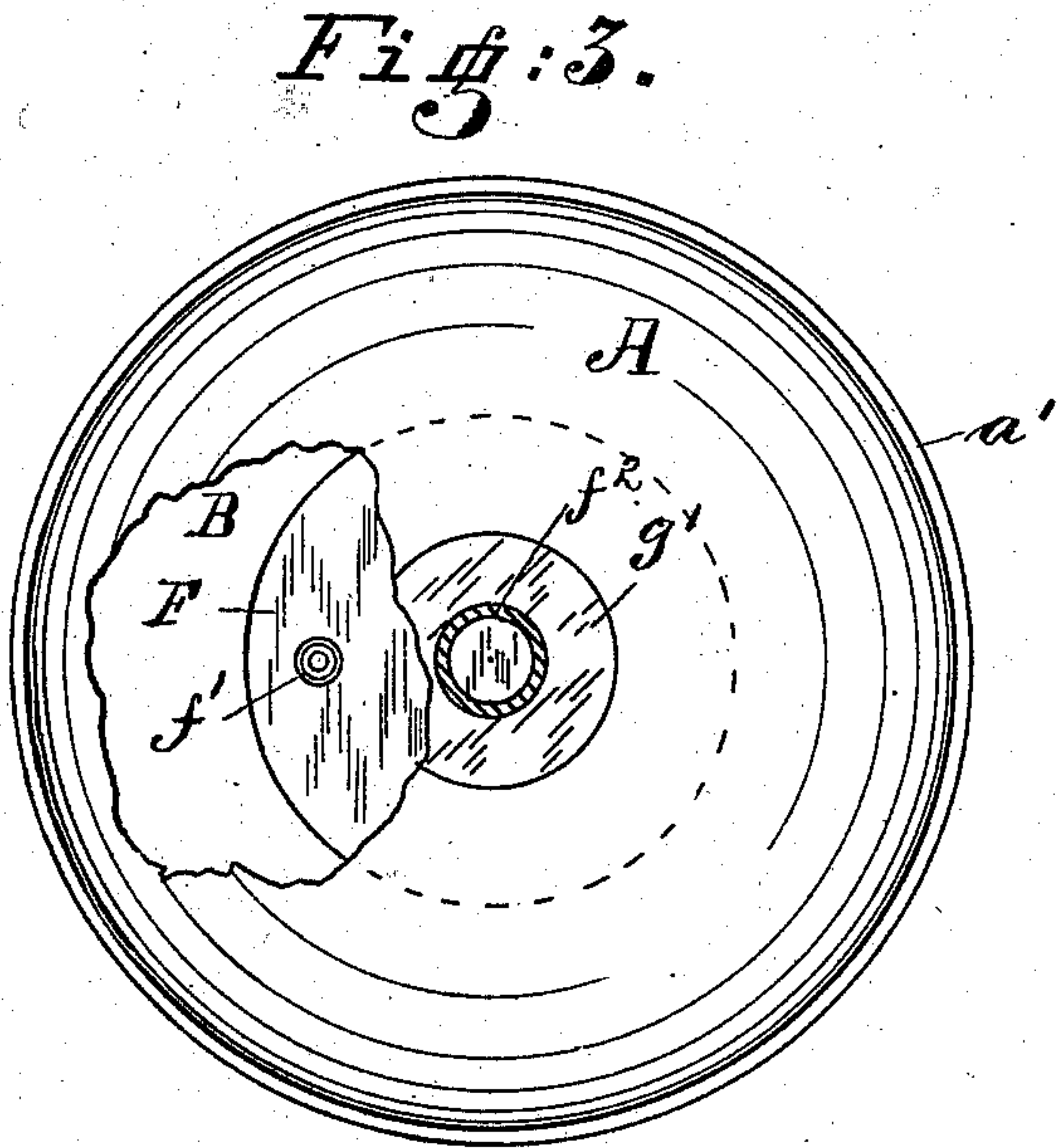
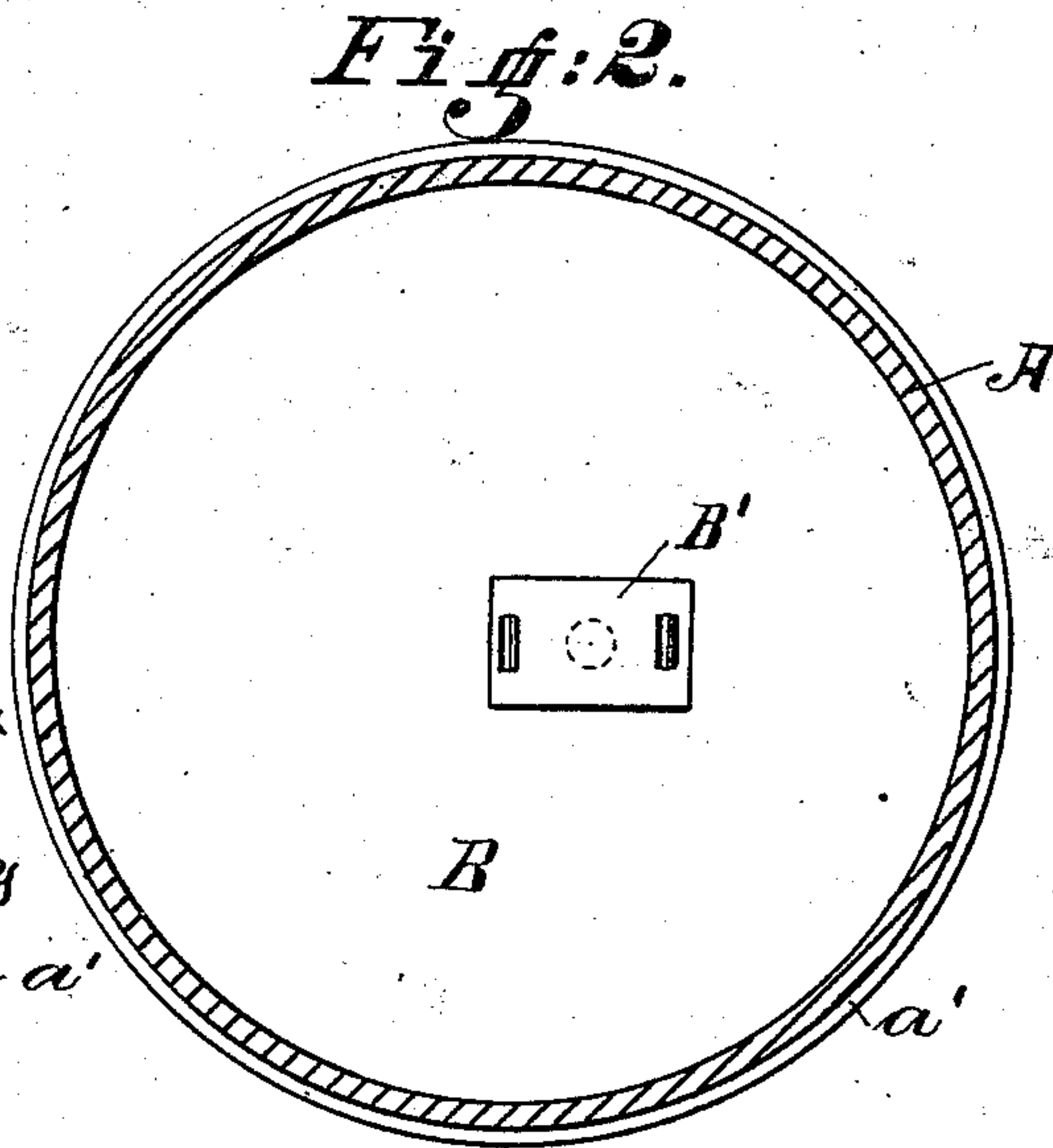
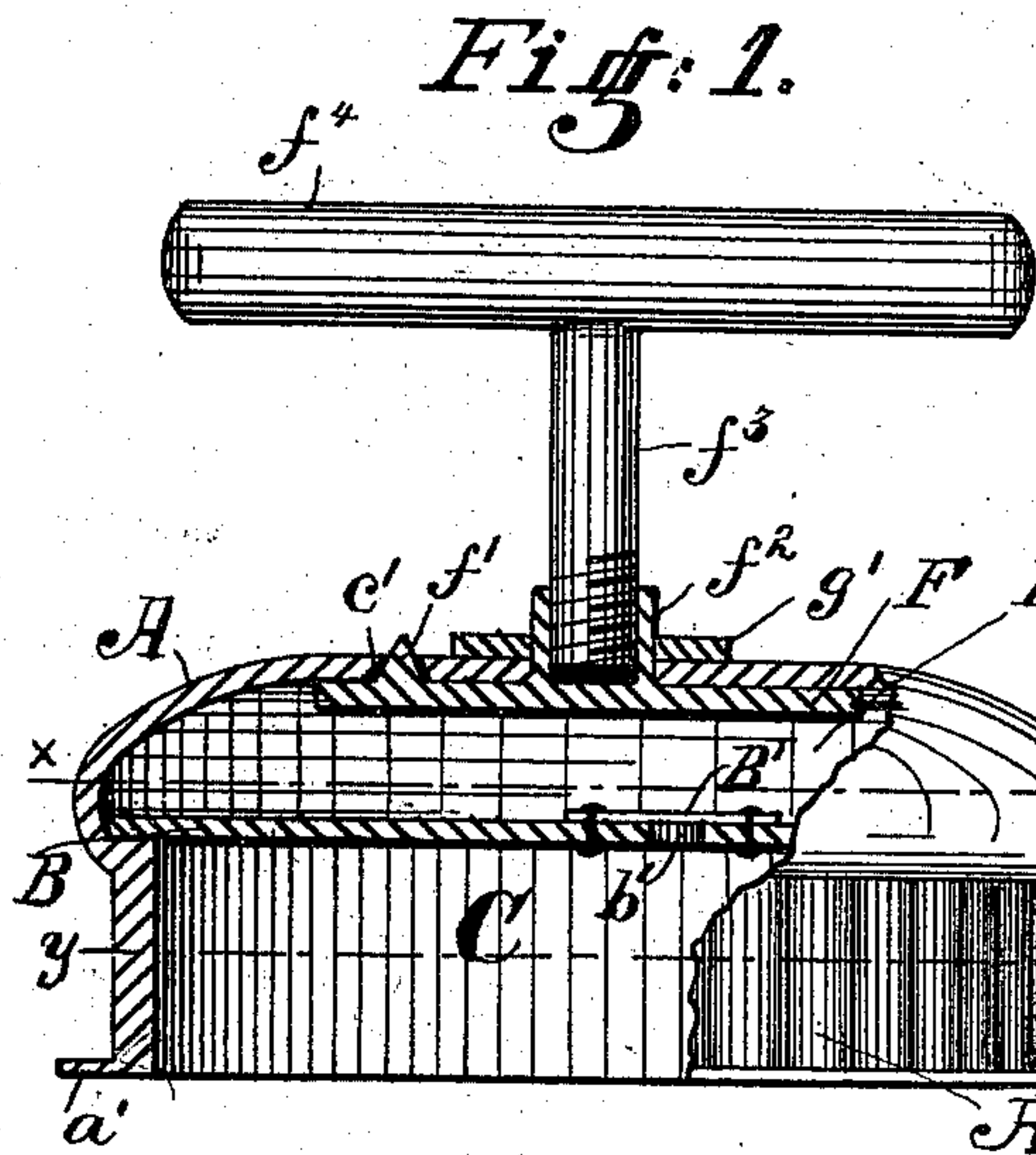
(Model.)

H. R. ALLEN.

COMBINED CUPPING DEVICE AND VACUUM PUMP.

No. 412,446.

Patented Oct. 8, 1889.



Witnesses:

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UNITED STATES PATENT OFFICE.

HORACE R. ALLEN, OF INDIANAPOLIS, INDIANA.

COMBINED CUPPING DEVICE AND VACUUM-PUMP.

SPECIFICATION forming part of Letters Patent No. 412,446, dated October 8, 1889.

Application filed January 5, 1889. Serial No. 295,563. (Model.)

To all whom it may concern:

Be it known that I, HORACE R. ALLEN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Combined Cupping Device and Vacuum-Pump; and I do hereby 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.

This invention relates to improvements in cupping devices used in surgery, the object of the invention primarily being to provide a cheap, simple, and effective cupping device and combine therewith in a compact form a vacuum-pump, the whole being as one device, to thereby obviate the use of tubing and separate pumps and connections heretofore in common use.

Surgical cups of ordinary construction have usually been made of glass, vulcanized rubber, or metal, and have been connected to separate vacuum-pumps (usually ordinary piston-pumps) by means of flexible tubing, it being with cups of this construction necessary to create a vacuum in the cup to exhaust the air by operating the pump before the said cup would adhere to the part to which it was applied, thus necessitating the holding of the cup in one hand and the operation of the pump with the other, which was difficult to accomplish without assistance, the task being a laborious and rather unsatisfactory one. Again, glass, hard rubber, or metal cups are apt to bruise and discolor the parts of the body of the subject to which they are applied.

Another and one of the chief objects of this invention is to so construct and combine the pump with the cupping device that it may be applied and effectively operated with one hand and secure results that are practically impossible with cups dependent upon separate pumps and connections for atmospheric pressure and vacuum, by doing away with numerous connections and joints, obviating leakage, and having a direct connection between the pump proper and the vacuum-chamber of the cup, rendering the operation of the cup and its application to the subject a matter of the greatest simplicity and the life of the device of great duration.

Another object of the invention is to con-

struct the combined cupping device and pump in such compact form that it may be easily carried in the pocket without inconvenience, and so that it is always ready for use without making connections with tubes, &c.

With these objects in view the invention consists in certain details of construction and in the combination and arrangement of the several parts of the combined cup and vacuum-pump, substantially as hereinafter described and claimed.

Figure 1 represents in central vertical section, partially in side elevation, a combined cupping device and vacuum-pump constructed in accordance with my invention; Fig. 2, a plan view of the same, the handle being removed and a portion of the cup being broken out to show the interior of the air-chamber; Fig. 3, a horizontal cross-section of the same on dotted line *x x*, Fig. 1, looking in the direction of the arrow; and Fig. 4, a sectional detail showing the corrugated wall of the cup-casing, taken on dotted line *y y*, Fig. 1.

In the drawings, A represents the side or wall of the cupping device, which side or wall has an air-chamber and vacuum-chamber, and in connection therewith will preferably be made of flexible rubber all in one piece, as shown clearly in Fig. 1 and as hereinafter more fully described, the side or body of the cupping device being preferably circular in form and having at its lower end an outwardly-projecting annular flange *a'*, which flange will preferably be of less thickness than the main body of the cup, so as to form an adhering lip that will not bruise or discolor the skin when the cup is applied. The side or vertical portion of the cup will preferably be corrugated vertically to stiffen the body of the cup.

I do not desire to limit myself to a one-piece cup, as the same might be made in a series of pieces suitably joined together. A one-piece cup is, however, preferable. Neither do I desire to limit to the exact shape of cup shown in the drawings, nor to the construction of a cup from elastic rubber entirely, as the lower or corrugated portion of the cup might be made of metal or other material with an elastic lip or flange at the bottom and an elastic top secured thereto in any suitable manner.

Formed in the inner wall of the cup at a

distance considerably remote from the lower or flanged edge is a shoulder or annular flange a^2 , which forms a bearing for the edge of a diaphragm-plate B, which is secured thereto or held in place by the edge of the top of the cup. This diaphragm-plate, which is preferably constructed of metal and of a shape to correspond to the cross-sectional shape of the cup, divides the interior of the cup virtually into two compartments—i. e., the lower or vacuum compartment C and the upper or air compartment D—an opening b' through the plate communicating with the two compartments, forming an outlet-port for the air in compartment or chamber C, when the cup is applied and the operation of pumping proceeded with to exhaust the air in chamber C. This port b' is covered by a flexible valve B' , preferably sheet-rubber, which is fixed to the upper side of the diaphragm-plate B at one or more points, as shown in Figs. 1 and 3.

Formed through the top of the cup, as shown in Fig. 1, is an opening c' , communicating with the air-chamber D, which opening forms an exhaust-port, through which the air drawn from the vacuum-chamber C into the air-chamber D is expelled.

Located within the air-chamber is a disk F, formed, preferably, of metal, and formed upon or secured to the upper face of this disk is a cone-shaped valve f' , which registers with and has its seat in the exhaust-opening c' , and closes said opening at the upward stroke of the pump-disk F. This disk F will preferably have an internally-threaded central collar f^2 , which extends through a central opening in the top of the cup, as shown in Figs. 1 and 2, an operating-rod f^3 , secured to a horizontal handle f^4 , being screwed into said collar, and operating to move the disk F upward and downward to exhaust and expel the air from chamber C, the disk F, rod f^3 , and handle f^4 forming, in connection with the air-chamber D, flexible casing, and valves, a vacuum-pump to exhaust and expel the air in chamber C.

It is obvious that, instead of a socket or collar being formed upon the pump-disk, it might have a vertical screw-threaded boss, and that the connecting-rod might be made of tubing internally screw-threaded at its lower end and screwed onto said boss upon the disk, the two constructions described being equivalent.

It will be seen that by making the valve f' upon the pump-disk conical, and making the exhaust-opening in the top of the cup of less diameter than the diameter of the base of the cone-shaped valve, the valve in its ascent with the disk in exhausting the air will enter the opening c' , and the rubber around the opening will be pressed tightly down upon the base or enlarged portion of the valve, thus effectually closing the exhaust-opening c' and rendering the same air-tight.

The operation of my improved device is as follows: The flanged end of the cup is first placed around the part of the body it is desired to cup, the handle f^4 being depressed to exhaust the air in the air-chamber D, and as it is pulled outward the air in vacuum-chamber C is drawn upward through the outlet-opening b' , the sheet-rubber valve B' being lifted by the atmospheric pressure and enters the air-chamber D, whence as the handle and pump-disk are again depressed it is discharged through the exhaust-opening c' into the outer atmosphere. This operation of reciprocating the pump-disk and upper portion of the casing is repeated until the requisite vacuum and atmospheric pressure is created, which, in consequence of the simplicity of the device and the operation, may be easily calculated and regulated to a minute degree.

Tightly impacted around the stem or collar of the disk F, and secured to the outside of the top of the flexible casing, is a flexible washer g' , which not only acts as a packing to prevent the escape of air at this point, but keeps the parts in a close and proper relative position.

The advantages of my improved device will be readily apparent to those skilled in the art to which it appertains and need not be commented upon at length.

I claim—

1. In a cupping device, a cup-shaped casing of elastic rubber corrugated vertically at its lower portion to stiffen that portion and having an annular outwardly-projecting flange at its lower open end, substantially as described.

2. In a cupping device, the one-piece elastic body A, open at its lower end and having an opening in its upper portion, the diaphragm-plate B, dividing the body into compartments, with a valve-closed port between them, the disk F, secured to the inner upper side of the casing, and the handle connected therewith, substantially as and for the purpose described.

3. In a cupping device, a one-piece cup-shaped elastic casing divided by a plate with a valve-closed port therein into two compartments, and having an exhaust-port in its upper portion, in combination with a handle secured to the upper portion by a disk or plate upon the inside, having a conical valve thereon to close the exhaust-port in the casing, and a washer upon the outside to tightly impinge the casing between it and the disk, substantially as shown and described, and for the purpose set forth.

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

HORACE R. ALLEN.

Witnesses:

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