

G. E. Hayes' Steam Compressor for Vulcanizing Flasks.

Assigned to the

Fig. 1

Buffalo Dental Manufacturing Company

73326

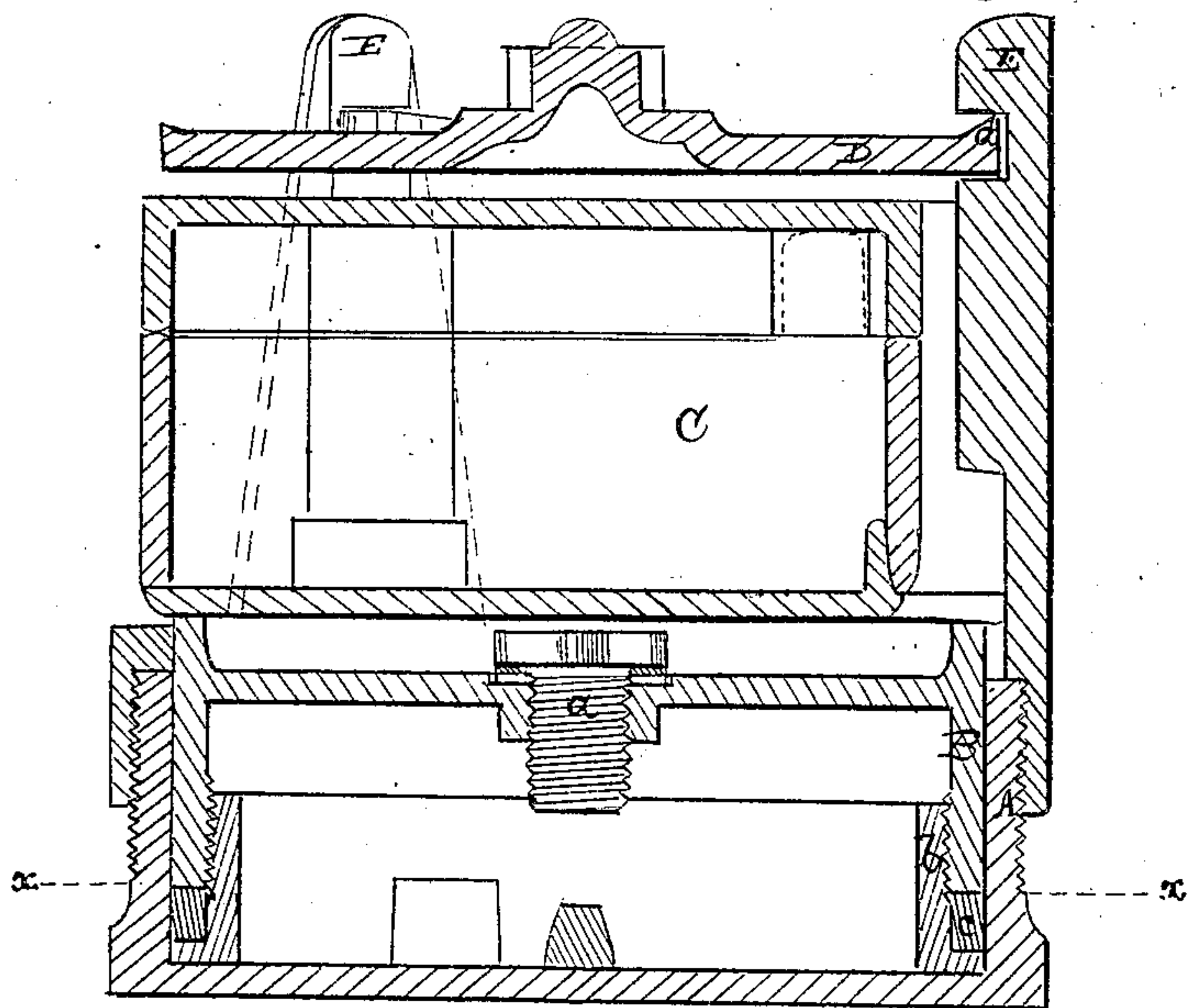
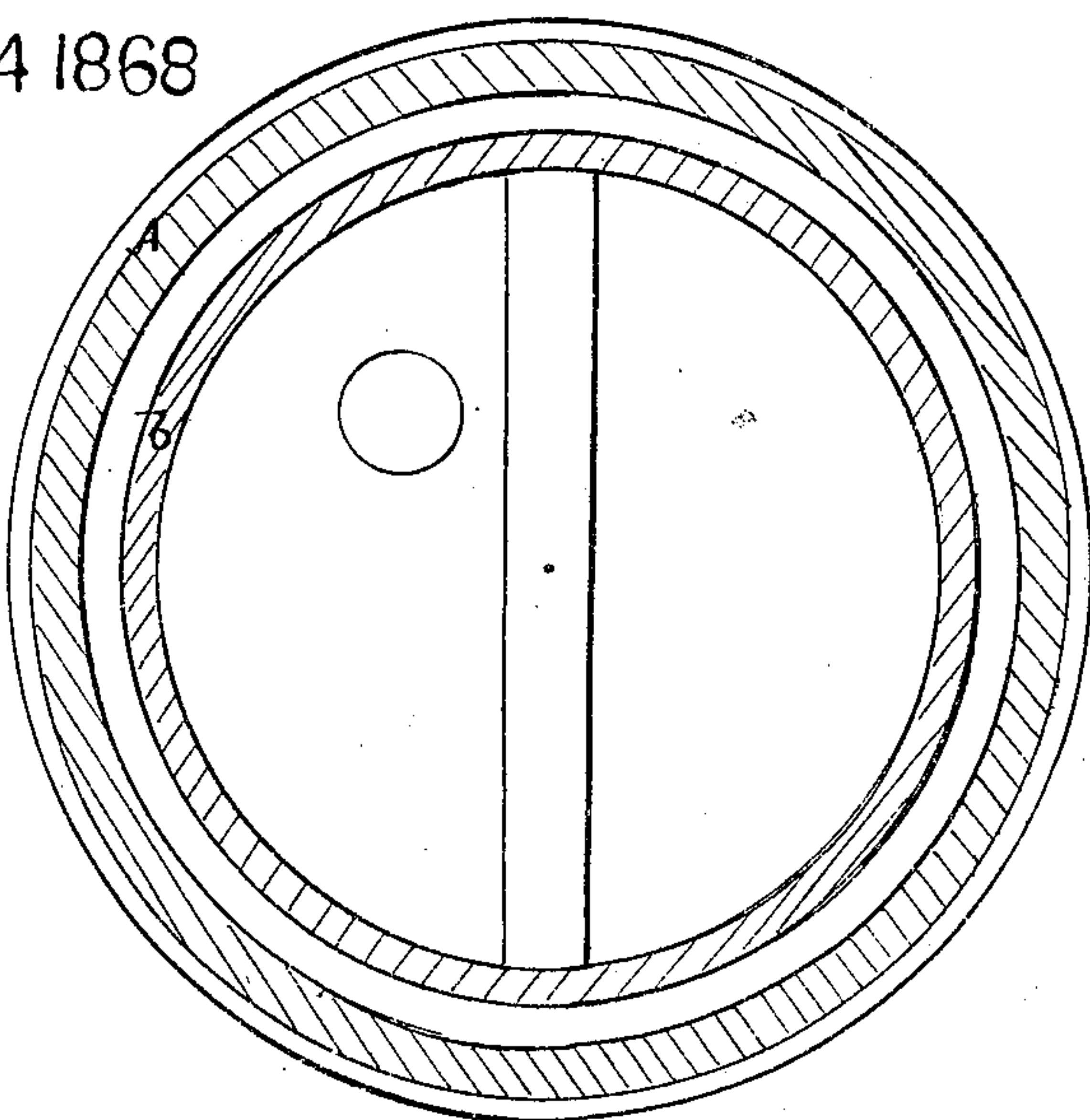
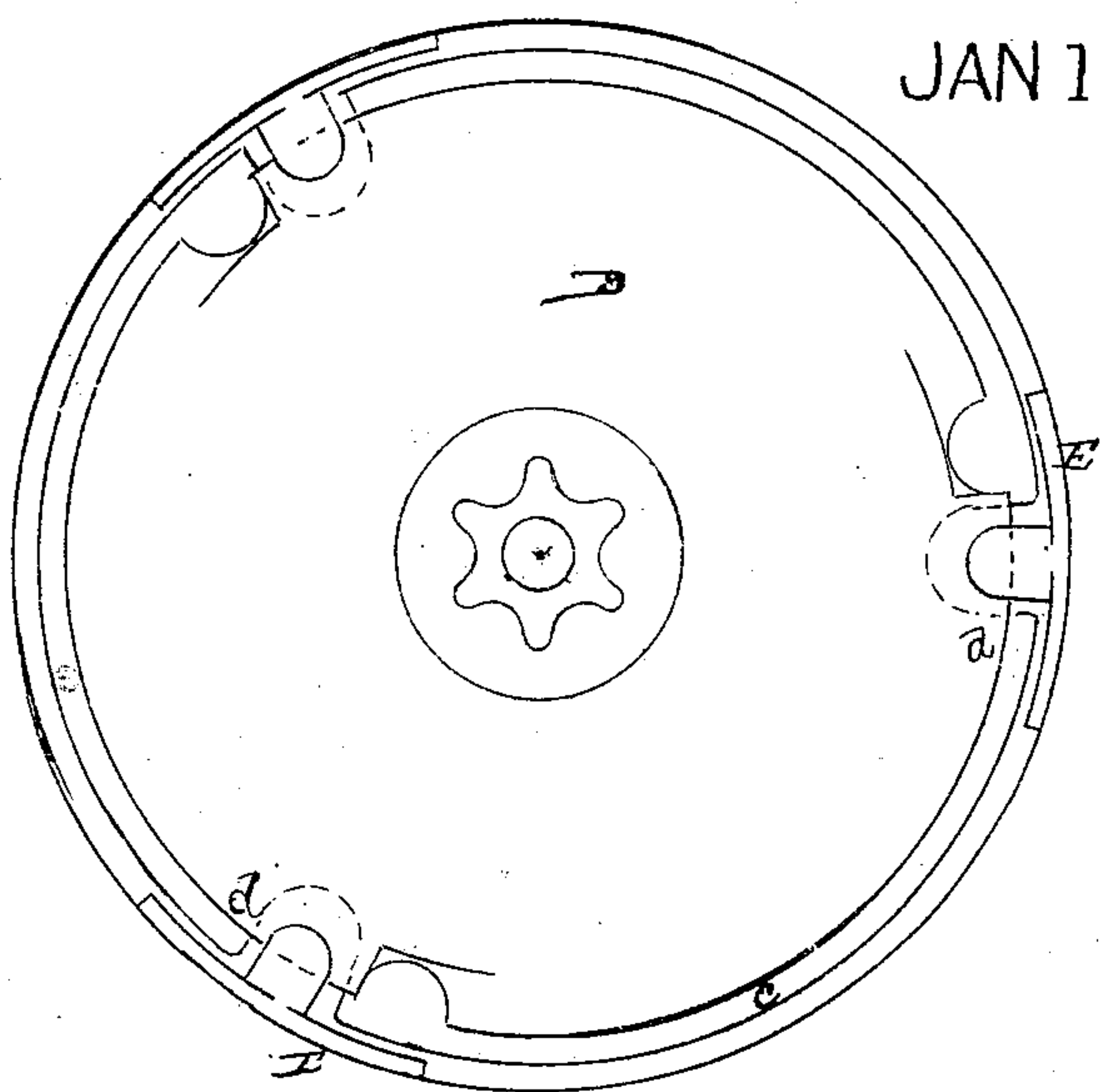


Fig. 2

PATENTED

JAN 14 1868

Fig. 3



Witnesses:

*McCombs
H. L. L. L. L.*

*G. E. Hayes
Per Brown & Co.*

United States Patent Office.

GEORGE E. HAYES, OF BUFFALO, NEW YORK, ASSIGNOR TO BUFFALO DENTAL MANUFACTURING COMPANY, OF SAME PLACE.

Letters Patent No. 73,326, dated January 14, 1868.

IMPROVEMENT IN STEAM-COMPRESSER FOR VULCANIZING-FLASKS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, GEORGE E. HAYES, of Buffalo, in the county of Erie, and State of New York, have invented a new and useful Steam-Compressor for Vulcanizing-Flasks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, and in which—

Figure 1 represents a vertical transverse section of a steam-compressor with flask and clamp combined.

Figure 2 a plan of the same, and

Figure 3 a horizontal section through the line *x x* in fig. 1.

The object and nature of my invention will be best explained by the following prefatory remarks. In the ordinary process of packing and closing flasks for dental vulcanite work, both the mould and the rubber are first heated up to the boiling-point of water, after which the rubber is laid in the mould, and the flask closed and placed within a clamp or other pressing-device, and heat again applied before it is considered safe to press or bring the sections of the flask in close contact. My invention dispenses with this double heating, and, as a process, differs essentially from such ordinary method, and, although employing steam as the compressing force to close the flask-sections, radically differs from the application to close the flasks by steam generated within the vulcanizer and surrounding the flask, and applied to close the latter through the agency of a piston fitting the upper portion of the vulcanizer. In this latter case, the closing pressure on the flask increases as the rubber becomes more highly heated, and this goes on up to the point of the necessary vulcanizing-temperature, when a maximum of pressure is attained, which is liable to damage the work in the mould. This, my invention obviates, by causing the closing pressure on the flask to be in advance of the heating action on the moulds, and when the rubber stands at a comparatively low temperature, and is more plastic than when highly heated. And my invention consists in a steam-compressor to the flask, separate and distinct from the vulcanizer, though for operation within it, and so arranged as that the heat applied to effect vulcanization is primarily and more sensitively felt by the compressor, and is conducted to the moulds through it, and whereby steam generated outside of the compressor, within the vulcanizer, has a counteracting tendency upon the compressor, to prevent undue strain or pressure on the moulds. Likewise the invention consists in the employment of alcohol or other volatile liquid within the compressor, or adding the same to the water therein, for operation with water on the outside of the flasks, and so that the fluid or vapor within the compressor, having greater elasticity than water outside, will operate to close the flask in advance of the action of the steam on the outside of the latter.

Referring to the accompanying drawing, A is a short cylinder, closed at its one end. Into this cylinder is fitted a second cylinder, B, also closed at its one and reverse end to that of the outer cylinder, which end, however, is shown provided with an opening, closed by a plug, *a*, for insertion of water or other fluid. This second cylinder, B, has screwed on to its inner end a ring, *b*, or is otherwise provided or constructed to carry a packing, *c*, for establishing a close joint with the outer cylinder, with freedom of up-and-down motion to the inner one. The instrument, steam-compressor or ram, thus or otherwise equivalently formed, being filled with water or other volatile liquid, and the screw-plug *a* closed, is then ready to be attached or clamped to the flask C. Any flask opening in sections may be used, and the moulds made in the usual way, or the cylinder of the compressor may be made to form the bottom or lower part of the vulcanizer.

To operate, first ascertain by weight or measure the quantity of rubber required, cut it into pieces, and lay them in the mould, as near as may be in the right position, after which, close and press the sections gently together with the hand, no heat being required. Then place the flask on or connect it with the compressor by means of a clamping-disk, D, having inclined projections, *d*, working through openings in or projections from frame-pieces E, connected with the outer cylinder of the compressor, or any other clamping-device may be used. The flask and compressor are then placed in the vulcanizer, the compressor resting, say, upon the flat bottom thereof, and the vulcanizer having no water put into it other than that contained in the compressor, and the plaster of the mould. The whole is then ready for the application of heat, which being applied to the bottom of the vulcanizer, must first pass through the compressor before steam can be formed above in the space surrounding the flask. When the water in the compressor has risen to 212° Fahrenheit, steam will begin to

form in the compressor, and the rubber in the flask will have become warm and soft. As the heat increases, the pressure of steam inside the compressor, through which the heat has first to pass, will constantly be greater than it will in the space above in which the flasks are placed, where steam can only form from water contained in the plaster moulds.

From this description it will be seen that the difference of pressure is brought to bear upon the flasks to close them and effectually fill the moulds, and that an early, powerful, closing pressure is induced upon the flasks, while the rubber is at a temperature much below the vulcanizing-point, and more plastic than when highly heated; also that the steam escaping from the plaster moulds, as well as any that may leak from the compressor at the higher temperature in the operation, will exert a counteracting effect upon the compressor, to prevent undue strain on the moulds as the temperature is raised to the vulcanizing-point. Here, it will be observed, therefore, that the steam itself surrounding the flasks, however supplied, has no effect whatever in closing them, but a contrary action, and if heated to the same temperature as the water in the compressor, would produce a balancing effect upon the compressor, causing it to exert no closing action upon the flasks, which, having been previously completed, remain stationary. It will likewise be seen that to repeat an operation, by this compressor, there is no piston to remove each time, which would be apt to impair the packing and occasion irregularity by leakage, and generally to retard the vulcanizing-process. The same water may be used over and over again in the compressor, which, on the heat being taken away from it, adjusts itself by condensation of the steam within it for a repetition of its use.

The same or a like process as is here described may be conducted in various ways. Thus, for instance, instead of filling the compressor with water only, there may be added a small proportion of alcohol or other fluid, the vapor of which has greater elasticity than the vapor of water, when, on the compressor and flask being placed as before in the vulcanizer, and water being added sufficient to cover the flask, the vapor of the alcohol having greater elasticity, forces up the inner cylinder of the compressor, and closes the flasks before vulcanization takes place. As some of the alcoholic vapor, however, is sure to escape, and might produce an undue pressure in the vulcanizer, the latter should be of proportionately increased strength.

When greater elasticity or rarity than that resulting from the use of water is desired, alcohol or other volatile liquid may be substituted for the water in the cylinder of the compressor.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The process, substantially as herein described, of closing the flasks under pressure of steam or vapor, during the operation of vulcanizing the rubber in the moulds, by means of a steam-ram or compressor connected with the flasks by a clamp or otherwise, and having the heat necessary to effect vulcanization transmitted through it in such manner as that the steam which is thus derived from a vessel that is distinct from the vulcanizer, though arranged within the latter, operates to close the flasks in advance of outside steam pressure on the latter, and while the rubber is at a comparatively low temperature, and plastic, essentially as herein set forth.
2. The steam-compressor, composed of cylinders A and B, in combination with a suitable clamp for holding the flask-sections in connection therewith, substantially as specified.

GEO. E. HAYES.

Witnesses:

CHAS. B. BROWN,
J. E. ROBIE, Jr.