(No Model.)

M. F. CARLL.

VULCANIZER.

No. 345,883. Patented July 20, 1886.

Fig. 2

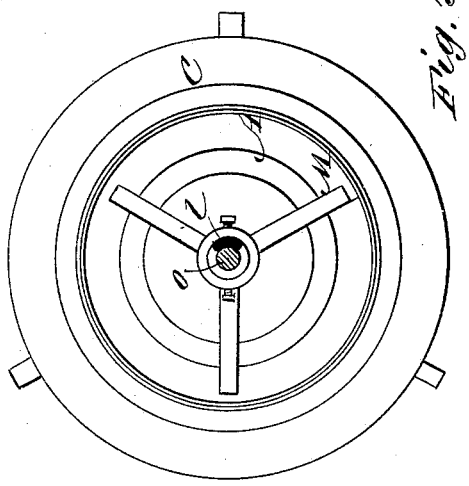


Fig. 3

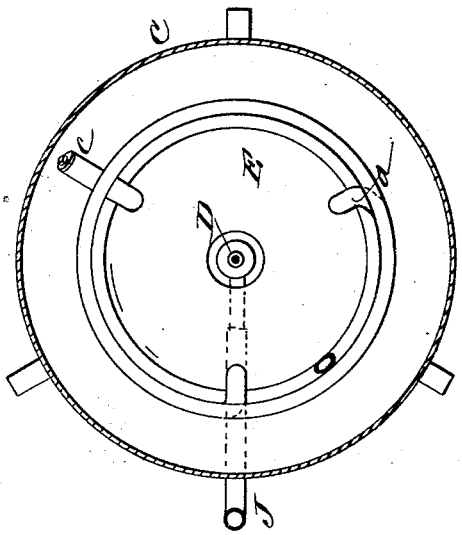
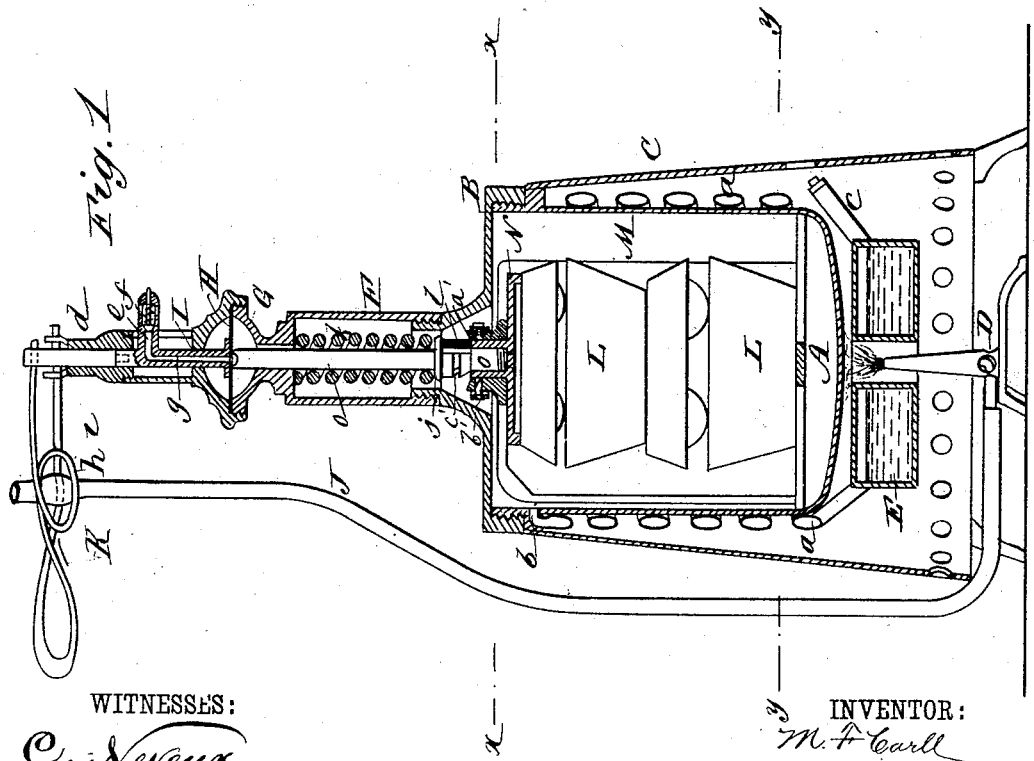


Fig. 1



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MASKELL F. CARLL, OF PROVIDENCE, RHODE ISLAND.

VULCANIZER.

SPECIFICATION forming part of Letters Patent No. 345,883, dated July 20, 1886.

Application filed May 12, 1886. Serial No. 201,960. (No model.)

To all whom it may concern:

Be it known that I, MASKELL FRANK CARLL, of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Vulcanizers, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a vertical transverse section of my improved vulcanizer. Fig. 2 is a horizontal section taken on line *x x* in Fig. 1. Fig. 3 is a horizontal section taken on line *y y* in Fig. 1.

Similar letters of reference indicate corresponding parts in the different figures of the drawings.

The object of my invention is to provide a vulcanizing-oven for dental work in which dry steam is supplied to the vulcanizing-oven, and in which the molds containing the work are closed by spring-pressure after the rubber or other plastic material is softened by the heat of the steam.

My invention consists in the combination, with the vulcanizing-oven, of a steam-generator exterior to the oven, but connected therewith by a spiral superheating-pipe for delivering dry hot steam to the oven.

It also consists in a spring-acted foot-piece or follower, which is released by the melting of a fusible metal block or plug when the heat is sufficiently great to soften the rubber or other plastic material in the molds, so that the spring may close the molds and pack the rubber or plastic material therein.

It also further consists in an automatic device for shutting off the gas after the work of vulcanization or molding is completed.

The vulcanizing-oven A is provided with a screw-cap, B, and is supported in the jacket C over the Bunsen gas-burner D, in the usual way. Below the oven A is located an annular steam-generator, E, which surrounds the upper portion of the burner D, and is connected with the top and bottom of the oven A by a spiral tube, *a*, wound around the oven A, and discharging into the oven through the opening *b* near the top thereof. The annular boiler E is provided with a screw-capped tube, *c*, for the purpose of filling the boiler with water. The annular boiler E contains sufficient water to maintain steam for the proper length of time for the vulcanization of the rubber, or for softening and molding of other plastic material. The cap B is provided with a hollow cylinder, F, surmounted by a diaphragm-casing, G, containing the diaphragm H. A rod, I, connected with the diaphragm is provided with a hard-wood extension, extends through a guide, *d*, formed on the top of the diaphragm-case, and is provided with a lateral branch, *e*, extending through the guide, and containing an ordinary spring-acted safety-valve, *f*, which communicates through a passage, *g*, formed in the rod I and the branch *e*, with the space below the diaphragm H. The safety-valve *f* is arranged to blow off at the pressure required for vulcanization in the oven A.

The flexible tube J, by which the burner D is supplied with gas, passes through a wire nipper-tap, K, which is arranged in connection with the diaphragm-rod I, to regulate and finally shut off the gas flowing to the burner. The nipper-tap K consists of a wire inserted in the side of the guide-cap *d*, returned upon itself, and bent to form the loop *h*, and is finally inserted in a transverse hole formed in the rod I near the top thereof. The flexible tube J passes under the loop *h* and over the arm *i* of the nipper-tap, and the arm *i* is bent outward into the loop *h*, so that when the loop is moved upward it will pinch the flexible tube against the lower surface of the arm *i*, and when it is allowed to move downward it will pinch the flexible tube against the upper side of the arm *i*.

The flasks L, containing the work to be vulcanized or molded, are received by a three-armed yoke, M, having in the top thereof a follower, N, secured on the end of a rod, O. The rod O is provided with a collar, *j*, for taking the pressure of the spring *k*, and it extends upward through the cylinder F into the diaphragm-case, and contacts with the under surface of the diaphragm H during the beginning of the vulcanizing or molding operation. A spiral spring, *k*, surrounds the rod O, and, abutting against the upper end of the cylinder F, tends to press the collar *j* and follower N downward. A curved spring, *a'*, partly surrounds the collar of the yoke M, and

is provided with a nib, b', which engages a notch, c', in the rod O when the flasks L are closed, and holds them in closed position.

In starting the vulcanizer or oven, the collar j is held in an elevated position by a ring or sectional block, l, of fusible metal, placed between the collar j and the top of the three-armed yoke M.

Work intended for vulcanization or molding is arranged in the flasks L, and the flasks L are placed in the three-armed yoke M, and the yoke with its contents is placed in the oven A, when the fusible ring or sectional block l will be inserted in its place, and the cover B will be screwed down upon the oven. In this position the loop h of the nipper-tap will be raised through the pressure of the rod O upon the diaphragm, and through the rod I, so that gas will be supplied to the burner D.

The annular boiler E is filled with water in the manner already described, and when the temperature in the oven reaches 220° Fahrenheit, or thereabout, the fusible ring or sectional block l will melt, permitting the spring k to exert its force upon the flasks L and their contents. The rubber or plastic material contained in the flasks, having been softened by the heat, is readily forced into all parts of the mold by the pressure of the spring. At the same time the temperature and pressure continue to rise until the upward movement of the diaphragm H, by carrying up the loop h, shuts off the gas flowing through the pipe J to just the amount needed to maintain the required pressure. At the same time the safety-valve f begins to blow off steam, and continues to do so until the water is entirely exhausted from the annular boiler E, when the pressure falls, and the elasticity of the wire nipper-tap K causes it to close down upon the pipe J and shut the gas off entirely from the burner. After the vulcanizing or molding the top may be removed, and the vulcanized or molded work may be taken at once from the oven. Two or more spirals, a, may be employed for superheating the steam, if desirable.

By means of my improvement the vulcanization or molding is accomplished with dry steam, the vulcanizer is made automatic in the regulation of the pressure, and also in the timing of the work, and the continuously-blowing safety-valve renders the oven free from the danger of explosion.

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

1. The combination, with a vulcanizing-oven, A, of the exterior boiler, E, and the superheating-pipes a, substantially as herein shown and described.

2. The combination, with the vulcanizing-oven A, of the annular boiler E, superheating-pipes a, the yoke M, follower N, rod O, spring k, and the fusible block l, substantially as herein shown and described.

3. The combination of the rod O, spring k, fusible block l, diaphragm H, rod I, nipper-tap K, and the flexible gas-supply pipe J, substantially as herein shown and described.

4. The combination, with the oven A, provided with the top B, having the diaphragm-casing G, of the diaphragm H, the rod I, having the passage g, the safety-valve f, the nipper-tap K, and the flexible gas-supply pipe J, substantially as herein shown and described.

5. In a vulcanizer, the combination of the rod O, provided with a collar, j, the spring k, the fusible block l, diaphragm H, the hollow rod I, carrying the safety-valve f, the wire nipper-tap K, and the flexible gas-supply pipe J, substantially as herein shown and described.

6. In a vulcanizer, the combination of the annular boiler E, superheating pipe a, vulcanizing-oven A, yoke M, follower N, the rod O, connected therewith, the spring k, fusible block l, the diaphragm H, the rod I, nipper-tap K, and the flexible rubber tube J, substantially as herein shown and described.

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Witnesses:
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