(No Model.) 2 Sheets—Sheet 1.

H. C. MILLER.

APPARATUS FOR VULCANIZING RUBBER AND FOR OTHER PURPOSES.

No. 332,408. Patented Dec. 15, 1885.

Fig. 1.

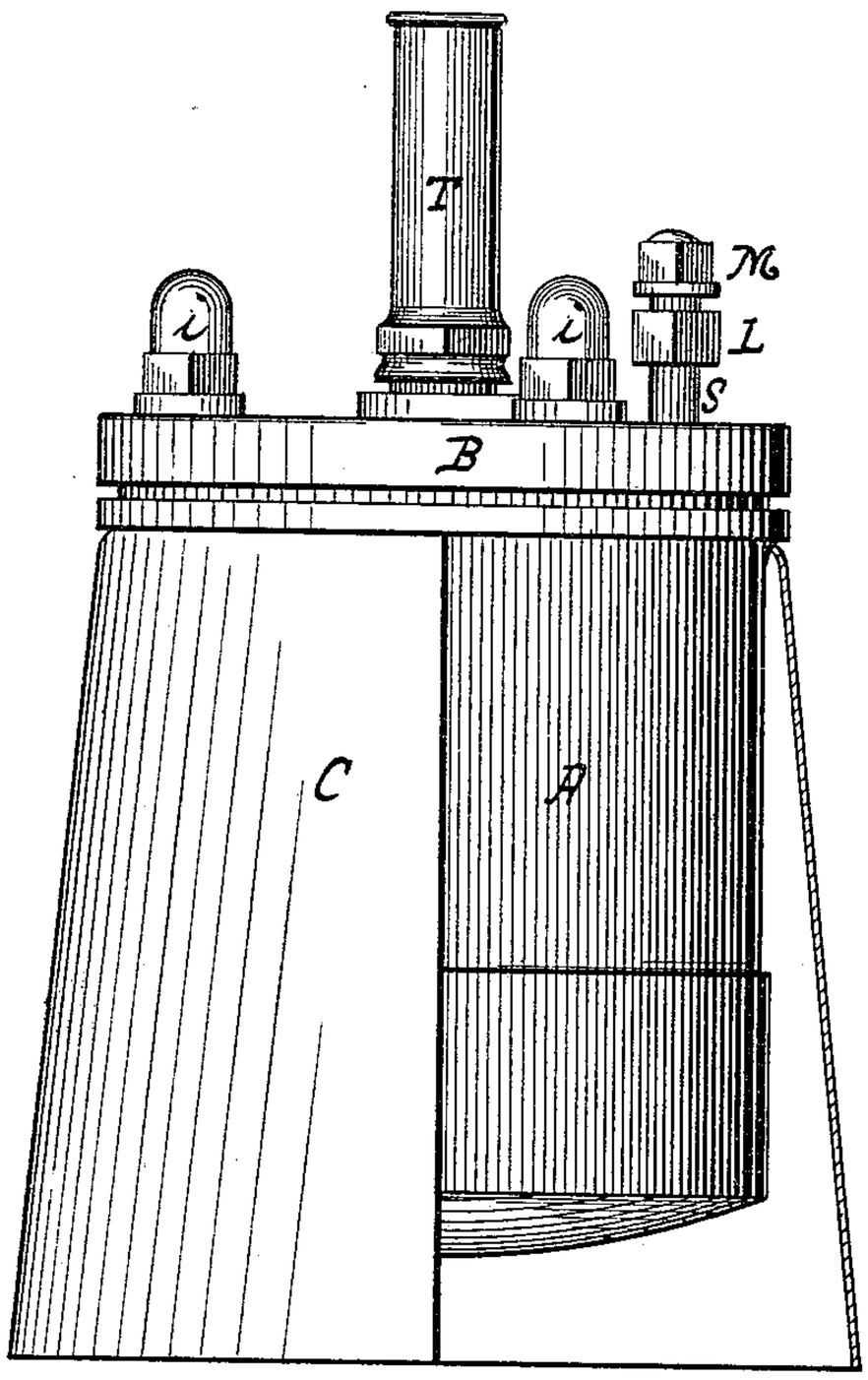


Fig. 2.

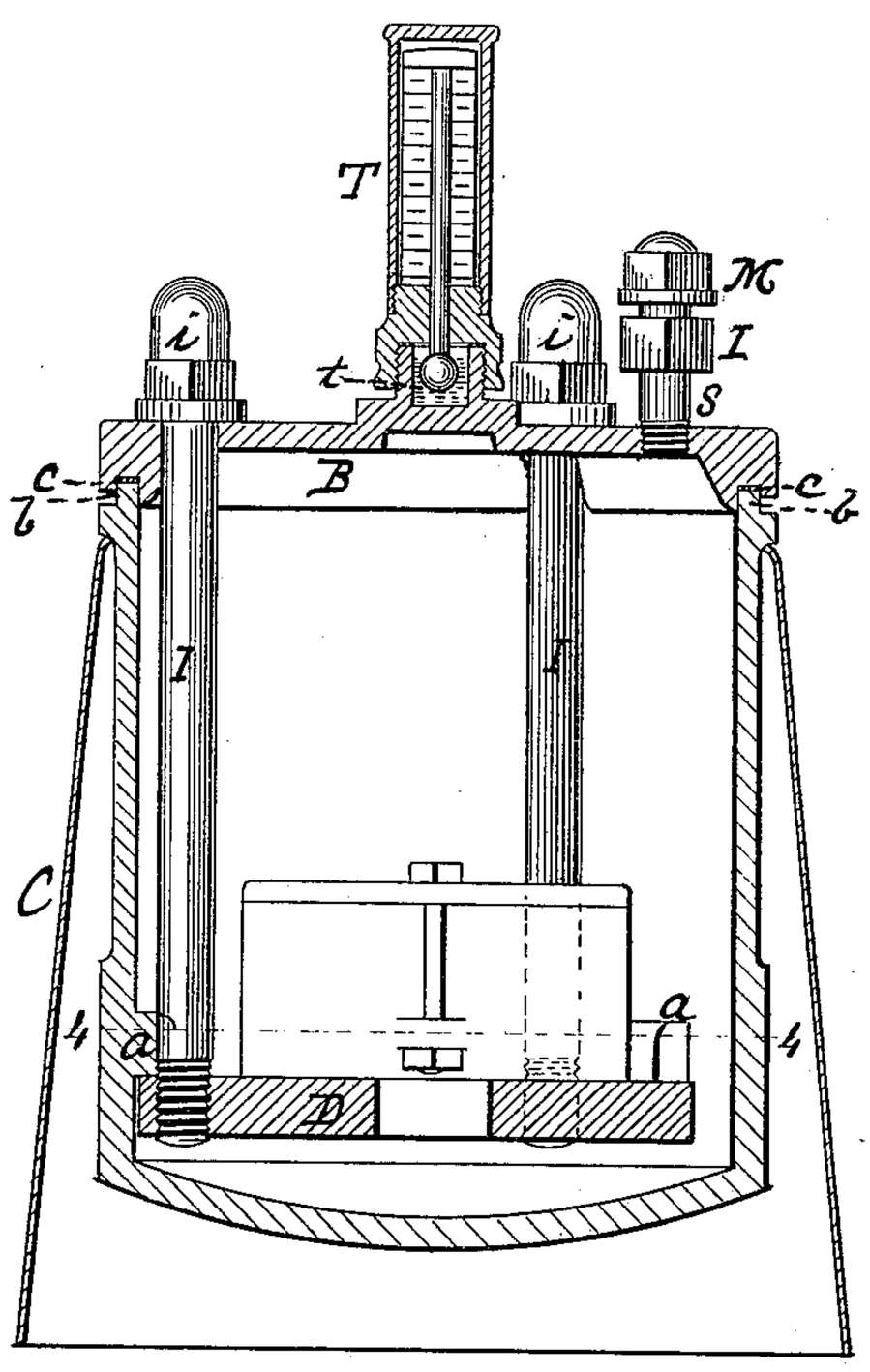
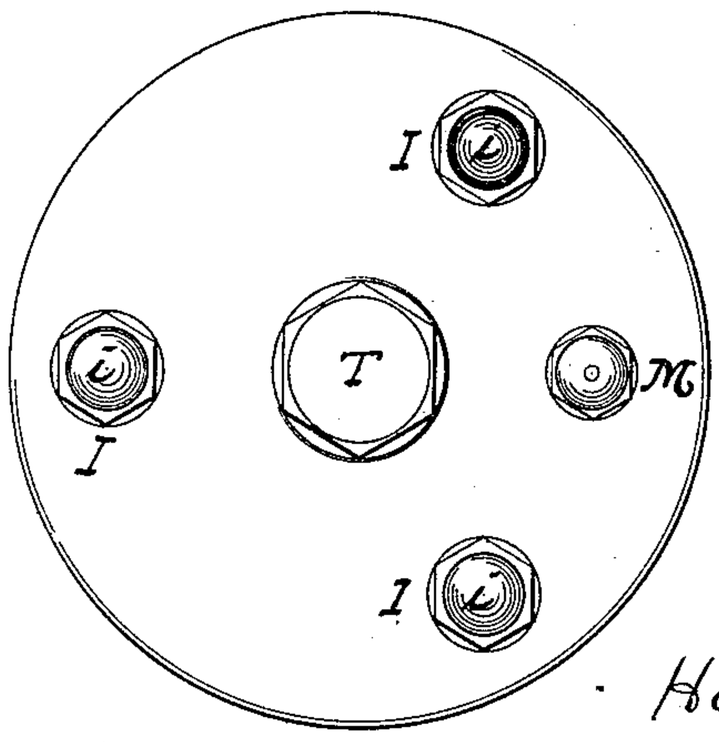


Fig. 3.



Attest:

Geo. H. Bender
H. C. Perkins

Inventor:

Herbert C. Miller.

(No Model.) 2 Sheets—Sheet 2.

H. C. MILLER.

APPARATUS FOR VULCANIZING RUBBER AND FOR OTHER PURPOSES.

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Fig. 4.

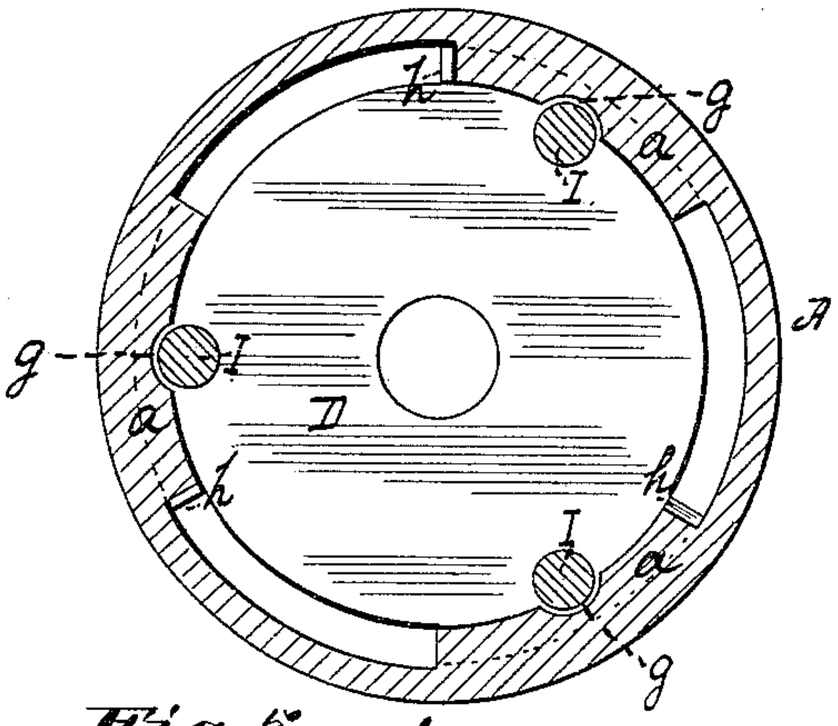


Fig. 5.

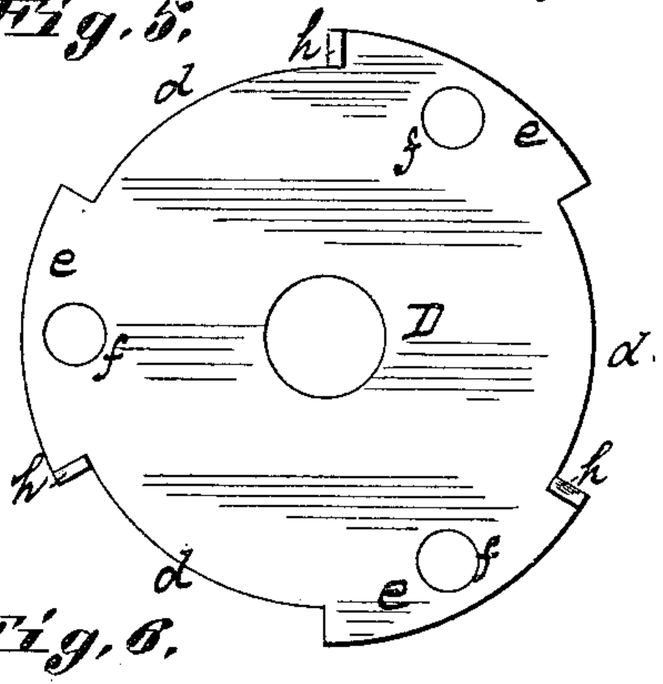


Fig. 6.

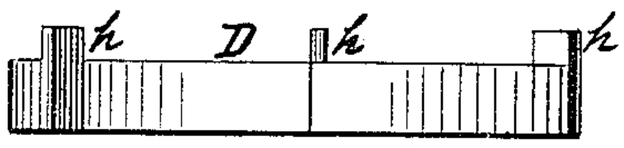
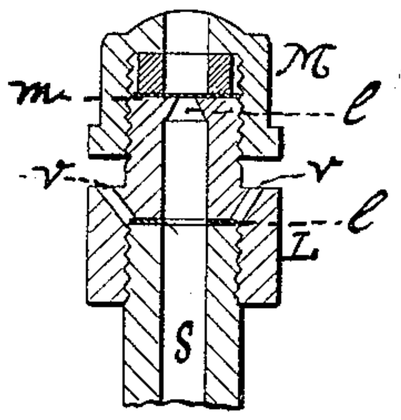


Fig. 7.

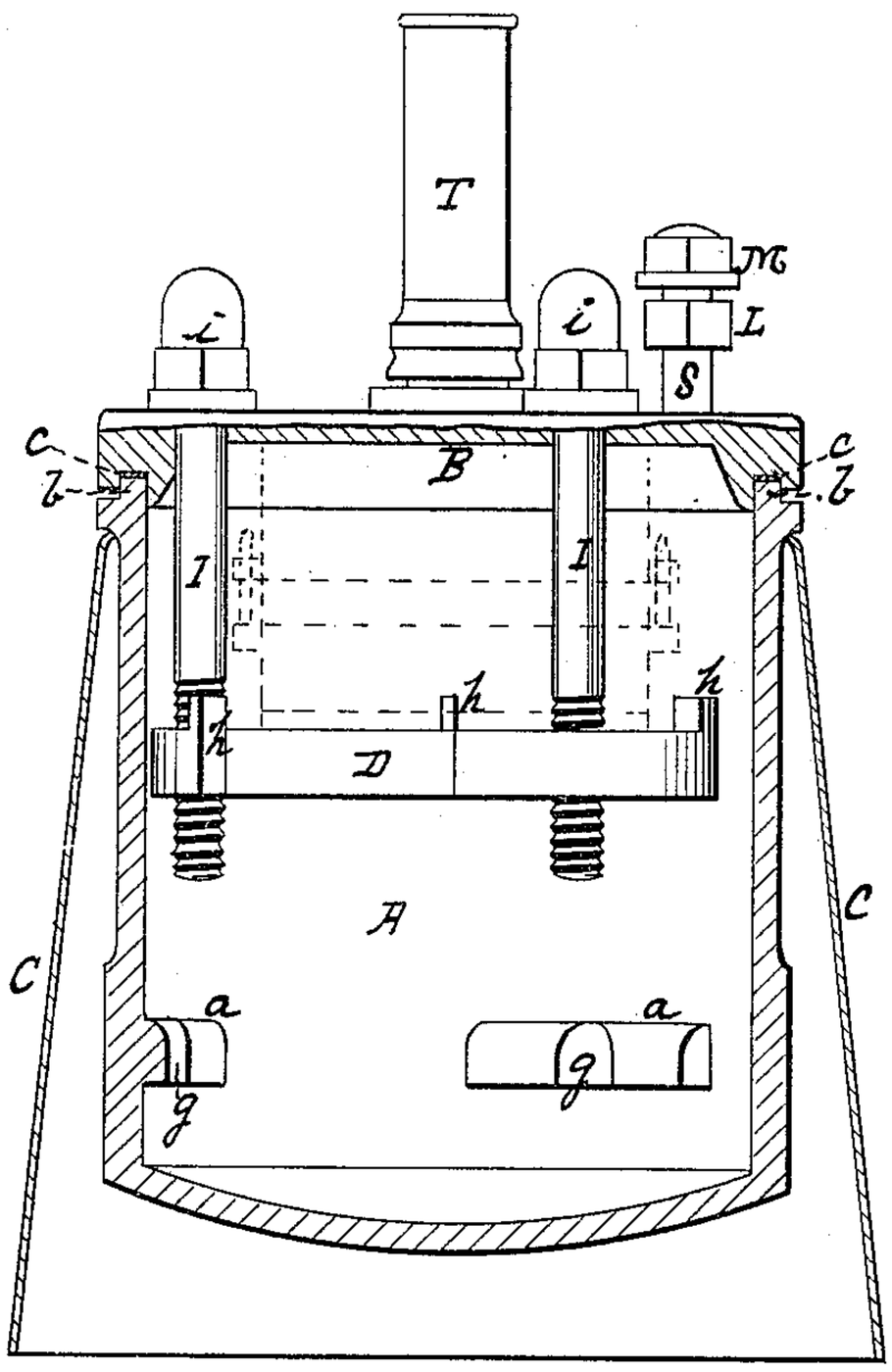


Attest:

Geo. A. Bender

H. C. Perkins

Fig. 8.



Inventor:

Herbert C. Miller.

UNITED STATES PATENT OFFICE.

HERBERT C. MILLER, OF ST. LOUIS, MISSOURI.

APPARATUS FOR VULCANIZING RUBBER AND FOR OTHER PURPOSES.

SPECIFICATION forming part of Letters Patent No. 332,408, dated December 15, 1885.

Application filed July 13, 1885. Serial No. 171,439. (No model.)

To all whom it may concern:

Be it known that I, HERBERT C. MILLER, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in the construction of vulcanizing apparatus for vulcanizing rubber compound and other vulcanizable gums and compounds for artificial teeth and other purposes, which apparatus by simple readjustment forms a complete press for molding celluloid and other pressible vegetable and other compounds; and I do hereby declare that the following is a full and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, and of which—

Figure 1 is an elevation of a vulcanizer, portions of the skirt or outer case being broken away to show the boiler. Fig. 2 is a vertical section of the same, showing the arrangement of the parts when used as a vulcanizer, with a flask in position on the false bottom. Fig. 3 is a top view of the vulcanizer, showing the arrangement of the bolts by means of which and the false bottom the cover of the vulcanizer is clamped on the boiler. Fig. 4 is a horizontal section on the line 4 4, Fig. 2, showing the false bottom arranged below the lugs or projections on the interior of the boiler. Fig. 5 is a detached plan view of the false bottom. Fig. 6 is an edge or side view of the same. Fig. 7 is a vertical sectional view of the steam vent or escape and of the safety devices to relieve the boiler or vulcanizer from undue steam pressure. Fig. 8 is a vertical section of the devices, showing the false bottom relieved from and placed above the lugs on the interior of the boiler, so as to act in conjunction with the boiler-cover to form a press for shaping celluloid. In this view the dotted lines indicate the flask containing the celluloid.

Like letters refer to like parts wherever they occur.

My present invention relates to the construction of vulcanizers commonly employed by dentists and for like purposes, and has in view a twofold object: first, the improvement of the vulcanizer itself as a vulcanizer; secondly, such a construction of the vulcanizer as will adapt it for use as a celluloid-press.

It is now a well-understood thing that under most conditions where vulcanite can be used—as, for instance, in the manufacture of plates for artificial teeth—celluloid may also be used to advantage, so that the operator who works one material is frequently called upon to work the other. The conditions precedent to the successful working of the two articles differ materially. For instance, vulcanite is best produced under steam-pressure in a closed chamber from the plastic material, while celluloid is best worked in a chamber practically unsealed, and is shaped by pressure while gradually softened by dry heat. In the case of a vulcanizer it is desirable that the boiler or flask-chamber cover be made practically steam-tight by means of the simplest form which will enable the cover to be readily applied and removed; also, that the construction, while being as simple and inexpensive as possible, shall insure sufficient strength in the boiler to resist all probable internal steam-pressure; and to accomplish this I provide a series of threaded bolts, which pass through the boiler-cover and enter a false bottom arranged within the boiler, said false bottom being confined by lugs or projections within the boiler. For greater security, the bolts may be of a metal which expands less than the boiler material for the same degree of heat, which will cause the joint between the cover and boiler to become tighter as the temperature rises. In the case of a celluloid-press it is not essential or even desirable that the joint between the cover and chamber (or boiler) be tight; consequently I make the false bottom of the boiler detachable, so that it may be moved above the lugs on the interior of the boiler, and used in conjunction with the cover and threaded bolts as a press, which hangs suspended from the cover within the boiler or heating-chamber. The application of these the two main features of my invention is exemplified in the drawings, which also illustrate minor details of peculiar value in a vulcanizer, as will hereinafter more fully appear.

I will now proceed to describe my invention more fully, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A indicates the boiler; B, the cover thereof, and C the outer case or skirt for confining the heat. The boiler A or flask-chamber is provided on its interior at inter-

vals and a short distance above its bottom with a series of lugs or projections, *a*, for confining a false bottom, D, and may be finished above with a plain lip or rim, *b*, for the reception of the cover B, or an interposed packing-ring, *c*, if the same is deemed desirable.

D indicates a false bottom of the general shape and area of a cross-section of the interior of the boiler in the plane of the lugs or projections *a*, or slightly less, so that when dropped into the boiler with the recesses *d* registering with the lugs *a* the false bottom D will freely pass the lugs *a* and rest on the bottom of the chamber A. The distance between the bottom of the chamber or boiler A and the under side of lugs *a* must be sufficient to allow the false bottom D to be rotated, so as to bring projecting portions *e* of the false bottom beneath the lugs *a* on the interior of the boiler, in which position the false bottom will be prevented from rising by the lugs *a*. In the projections *e* of the false bottom are threaded bolt-holes *f*, and in the lugs or projections *a*, on the interior of the boiler A or flask-chamber, are nicks *g*, and these two may be caused to register when the false bottom is rotated by means of projections *h* on the false bottom, or, if preferred, on the under side of lugs or projections *a*, which lugs prevent the rotation of the false bottom too far around.

The nicks *g* and projections *h* are not essential, but are desirable and advantageous, as when the parts are arranged as a vulcanizer they lock them rigid and prevent the accidental rotation of the false bottom and the loosening of the cover B.

B indicates the cover, which also forms the upper member or platen of the press when plates of celluloid are to be shaped. The under surface of the cover has by preference a recess for the reception of the rim of the boiler A, and (when used) a packing-ring, *c;* also, at regular intervals certain bolt-holes for the passage of threaded bolts I, a cup, *t*, for the bulb of the thermometer T, and a steam-escape pipe, S. The space within the cup *t* surrounding the bulb of the thermometer T may be packed with copper filings or equivalent material, which will readily convey the heat to the bulb, while serving as a packing to protect the bulb. Connected with the steam-escape pipe S are the vent and safety devices (shown in section, Fig. 7) for the apparatus when used as a vulcanizer. Generally stated, these devices consist of two nuts, L and M, the first or vent nut, L, fitting directly on the end of the steam-pipe S, and provided with vent-ports *v*, which are opened and closed by screwing the nut up and down on the pipe S. Between the vent-nut L and the end of pipe S a small packing-ring, *l*, may be placed to insure a tight joint when required. The upper end of vent-nut L is threaded for the reception of the cap-nut M, and over the bore of vent-nut L (which may be contracted, as at *l'*, if desired) is placed a thin sheet, *m*, of copper or equivalent metal, which is confined by the perforated cap-nut M. The thickness and character of the sheet *m* are to be such that it will be ruptured by any excess of steam-pressure in the boiler, and the steam can then escape through the perforated cap-nut M. If preferred, the cap-nut M and the thin safety-sheet *m* may be omitted, and a pressure-gage of the class commonly employed with vulcanizers may be screwed on the perforated vent-nut L. The character of such steam-pressure gage is so well understood that it is not deemed necessary to show or describe it, but simply to indicate its attachment to the vent-nut L. In order to open the vents *v*, all that is necessary is to turn the vent-nut L.

I indicates the threaded bolts, which serve not only to secure the cover B in position on the boiler A when the apparatus is used as a vulcanizer, but also as the screws of the press (of which the false bottom D may be considered the bed, and B the platen, or vice versa) when the devices are used as a celluloid-press.

It will be noted that in Fig. 2 a set of long bolts threaded only at one end is shown, while in Fig. 8 a short set threaded nearly half the length is shown. As a matter of convenience, it is sometimes desirable to have the two sets, but it is not an essential, as the long bolts may have the threads extended as far as desired. Moreover, the bolts may be reversed, if desired—that is to say, may have key-heads extending through slots in the false bottom D, with the threaded ends projecting through the cover B, and provided with nuts which occupy the places of the bolt-heads *i* of Fig. 2. However, the construction shown is preferred, and washers may be used between the bolt-heads *i* and the cover B to make tight joints, if desired.

By preference the boiler or chamber A, cover B, and false bottom D will be of copper, brass, or equivalent material, while the bolts I will be of iron or steel, so that the difference of expansion under given increments of heat will always insure a tight joint between the cover B and boiler A when the apparatus is used as a vulcanizer.

The devices being substantially of the character hereinbefore set forth, will be employed as follows: In order to use the apparatus as a vulcanizer, the false bottom D is inserted in the boiler A, with its projections *e* alternating with the projections *a* on the interior of the boiler, allowed to drop below said lugs *a*, and then rotated until its movement is arrested by lugs *h*, which will bring the threaded bolt-holes *f* in register with nicks *g* of the lugs *a* on the interior of the boiler. The requisite amount of water, but not enough to rise above false bottom D, is then poured into the boiler, the flasks containing the rubber to be vulcanized are placed or piled on the false bottom D, the cover B is placed on the boiler A so that its bolt-holes will register with the nicks *g* of lugs *a*, and the bolts I are inserted and screwed into the bolt-holes *f* of false bottom D. As the false bottom is held down by lugs

a, and therefore cannot rise, it follows that as the bolts I are screwed up the cover B will be forced down and held tightly against the rim *b* of boiler A, and a tight joint is thus obtained by simple means. The vent-nut L is screwed down to close the vent-ports *v*, and the thin sheet-metal safety-disk *m* (when used) is held in place by screwing down the cap-nut M. If a steam-gage is used, it takes the place of safety-disk *m* and cap-nut M, as before specified. Heat is applied to the boiler, and the vulcanization is accomplished in the usual manner. As the heat increases the difference in expansion between the bolts and the boiler and cover will insure a perfect steam-joint between the boiler and cover.

When the vulcanizing process is completed, the vent-nut L may be turned to unclose the vents *v* and permit the escape of steam from the boiler A.

In order to use the apparatus as a celluloid-press for shaping celluloid plates and other articles, the bolts I are first withdrawn from the false bottom D and the cover B removed. The false bottom D is then reversely rotated until the lugs *e* thereof can pass the intervals between the lugs *a* on the interior of the boiler A. The false bottom is then lifted out of the boiler, or above the lugs *a* thereof, and the bolts I again inserted, as shown in Fig. 8, when the flasks containing the celluloid plates can be placed on the false bottom D and between it and the cover. The false bottom D is then replaced in the boiler, (or the hot oven, as it now becomes,) and is suspended therein by the cover B resting on the rim of the boiler. As the celluloid becomes plastic under the gradually-increasing heat the screws I are gradually rotated to draw the false bottom nearer the cover B, so that the flasks which are held between cover B and false bottom D are gradually closed, as in a press.

The advantages arising from my invention are, first, the simple and effective manner in which the connection between the boiler and its cover is made and maintained; secondly, the simplicity and effectiveness of the combination of vent and safety devices of the vulcanizer, and, thirdly, the ease with which the arrangement of the apparatus can be changed to adapt it for use either as a vulcanizer or a celluloid-press.

I do not herein claim the safety-disk, as the same is not of my invention; but,

Having thus set forth the nature, operation, and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a vulcanizer, the combination, with a boiler having a false bottom secured therein, of a detachable cover and bolts which connect the cover with the fixed false bottom of the boiler, substantially as and for the purposes specified.

2. In a vulcanizer, the combination, with a boiler having a false bottom secured therein, of a detachable cover and bolts for connecting the cover with the false bottom of the boiler, said bolts being of a metal of a less expansible character than the boiler for given increments of heat, substantially as and for the purposes specified.

3. In a combined vulcanizer and celluloid-press, the combination of a boiler having lugs on its interior for securing a false bottom, a detachable false bottom, a cover, and threaded bolts for connecting the cover and false bottom, substantially as and for the purposes specified.

4. In a vulcanizer, the combination, with the steam-escape pipe, of a vent-nut having an axial orifice and lateral vents, and adapted for the attachment of a steam-pressure gage, substantially as and for the purpose set forth.

5. In a vulcanizer, the combination, with the steam-escape pipe, of a vent-nut having an axial orifice and lateral vents, and a perforated cap-nut adapted to secure a thin sheet of metal over the axial orifice of the vent-nut, substantially as and for the purposes specified.

HERBERT C. MILLER.

Witnesses:
GEO. H. BENDER,
DUNCAN BROWN.