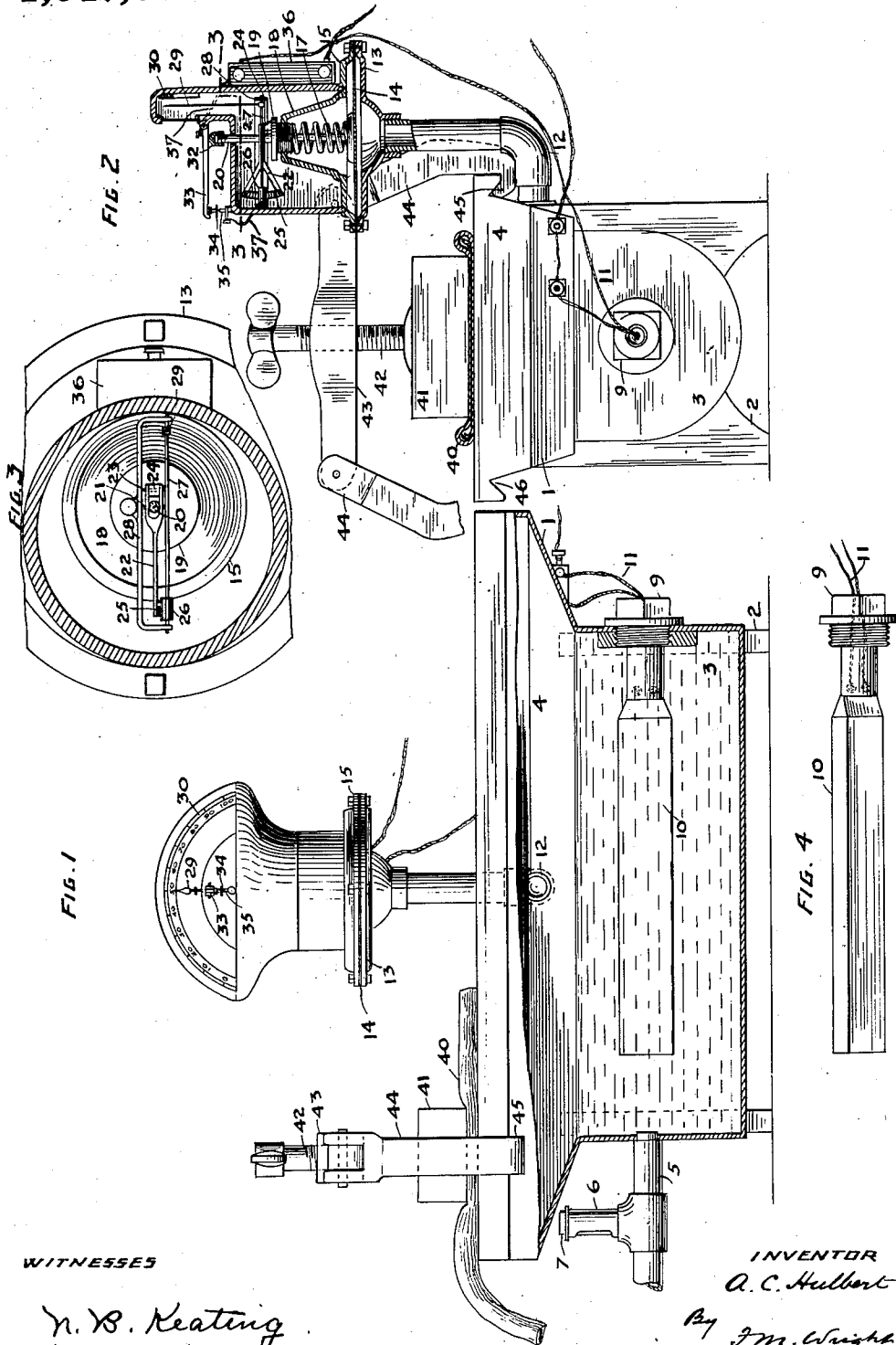


A. C. HULBERT.
ELECTRICALLY GENERATED STEAM VULCANIZER.
APPLICATION FILED OCT. 10, 1910.

1,047,060.

Patented Dec. 10, 1912.



WITNESSES

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ELECTRICALLY-GENERATED STEAM-VULCANIZER.

1,047,060.

Specification of Letters Patent.

Patented Dec. 10, 1912.

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To all whom it may concern:

Be it known that I, ANSEL C. HULBERT, a citizen of the United States, residing at Santa Rosa, in the county of Sonoma and State of California, have invented new and useful Improvements in Electrically-Generated Steam-Vulcanizers, of which the following is a specification.

My present invention relates to improvements in vulcanizers, and especially to that class of vulcanizers in which steam is used as the heating medium and electricity is used to generate the steam.

The object of my invention is to provide a vulcanizer of this character in which the electric heating element can be inserted in the steam generator quickly and conveniently and without the necessity of removing any part of the generator itself; also one in which the vulcanizer may be automatically maintained at any desired constant temperature; also one in which the variations of pressure, up to the minimum pressure permitted, will be very accurately registered.

In the accompanying drawing, Figure 1 is a side view of a vulcanizer certain parts being shown in vertical longitudinal section; Fig. 2 is a broken end view thereof; Fig. 3 is a horizontal section on the line 3-3 of Fig. 2; Fig. 4 is a detail side view of the electric heater, detached.

Referring to the drawing, 1 indicates a hollow casing supported upon feet 2. The lower portion 3 of said casing forms a water chamber, while the upper portion 4 is extended both longitudinally and transversely to form a steam chamber. The water chamber can be filled with water through a bent tube 5 entering one end thereof and having therein a water gage 6, the upper end of said tube being closed by plug 7. At the other end of said water chamber is secured, as shown at 8, a plug 9 having attached thereto an electric heating element 10 of any desired construction, conducting cords 11 leading to the poles of said heating element from the source of supply of electricity. From the steam chamber a bent pipe 12 extends outward and upward, and upon the upper end thereof is secured a pressure casing 13 upon which is secured the edge of a diaphragm 14, upon which is secured in turn the edge of a gage casing 15, said diaphragm being clamped between the edges of said gage pressure casings. The diaphragm 14 is nor-

mally depressed by a spring 17, contained in the cone shaped shell 18 secured to the gage casing, the upper portion of said spring casing being adjustably closed by a screw plug 19. A rod 20 is secured at its lower end to said diaphragm, its upper portion being pivoted, as shown at 21, to an arm 22 pivoted at 23 upon a standard 24 on the screw plug 19, the free end of said arm carrying a segment gear 25, which engages a pinion 26 upon a shaft 27 having bearings in the bent ends of a frame-piece 28 secured to said screw plug. To said rod is secured a pointer 29 which can move adjacent to a dial 30, thereby indicating the pressure. The upper end of said rod 20 has secured thereon a cap 32 made of insulating fiber which abuts against an arm 33 pivoted on the gage casing, the free end of which arm carries an electric contact 34, which is adapted to contact with a lower electric contact 35. The conducting cords 11 are connected to terminals of a condenser, bolted to the gage casing, the other terminals of said condenser being connected by wires 37 to the contacts 34, 35.

The piece of rubber to be vulcanized, shown at 40, is placed upon the top of the casing 1, and a foot 41 is placed upon said piece 40; said foot having a swivel connection to a screw 42 which is screwed through a bar 43, to the ends of which are pivoted arms 44 having at their lower ends hooks 45 which are adapted to engage undercut grooves 46 in the outwardly extending edges of the casing of the vulcanizer. Said screw is then screwed inward in said bar, clamping the piece of rubber to the vulcanizer. The electric heating element is entirely surrounded by water, and, the current being turned on, generates steam therefrom, which rises to the upper portion of the vulcanizer and is confined therein. The temperature of said steam, and therefore of the vulcanizer, varies with its pressure. Said steam presses against the under surface of said diaphragm and raises it against the spring 17, turning the pointer 29 so that said pressure may be observed by the indicating dial 30. When the temperature, and therefore the pressure, reaches a predetermined limit, the rod 20 is raised to such an extent that the cap 32 on its upper end raises the upper contact point 34 from off the lower 35 and breaks the circuit. The current then ceases and does not pass again until the tempera-

ture falls below the desired limit, whereupon the current again passes between the contact points 34 and 35.

It is desirable that the current used in the vulcanizer be alternating, for the reason that with a direct current too great an arc is formed between the contact points 34 and 35. It is for this purpose that I use the condenser 36, which prevents the formation of the arc when a direct current is used.

It will be seen that the apparatus herein disclosed is very economical and efficient, because the electric heater is entirely surrounded by water. The means for maintaining the temperature of the vulcanizer uniform is very accurate, since the slightest excess over the desired pressure breaks the electric circuit and prevents the further development of heat, until the temperature has again been reduced to the predetermined degree. Moreover, the device is not open to the objection heretofore found to exist in vulcanizers which depend upon a spring for transmitting pressure, as such springs become imperfect in their operation by the repeated action of the steam therein. It is to be observed that the spring in my invention is not exposed to the action of the steam. At the same time it can be easily adjusted to give accurate results.

By reason of a slight welding that may occur between the two points of contact it sometimes requires a force of several ounces to break an electric circuit. In my invention the force that is used is very considerable since the steam pressure is reduced about one-fifth on account of the leverage of the lever 33. But while the force which moves the rod 20 is reduced to about one-fifth when applied to the end of the lever 33, this force is reduced probably to 1/50th when applied to the end of the pointer, that is to say, the movement of the end of the pointer is about

50 times as great as that of the end of the rod. It is necessary that its movement should be large in order to obtain accurate readings. Prior devices have been employed in which the movement of the pointer itself has been utilized to break the electric circuit. From what has been already stated it will readily be seen that such devices are imperfect, because the amplitude of movement of the pointer must be very great, and therefore the force applied at the end of the pointer must be proportionately small, and this force has not been found sufficient to be depended upon to break the circuit at all times.

I claim:—

A vulcanizer comprising a hollow casing, an electric heater therein, a diaphragm adapted to receive on one side the pressure of steam generated by said heater from water in said casing, a rod moved by the movement of the diaphragm under the influence of said pressure, a circuit breaker in the circuit of the electric heater, a movable pointer and means coöperating therewith for indicating the pressure, said rod being arranged by its movement due to the increase of steam pressure to operate said circuit breaker to break the circuit, and a positive train of mechanism connecting said rod with said pointer to positively move said pointer correspondingly with the movement of said rod, the movement of the end of the pointer produced by said rod being many times greater than that of the movement of the contact breaker produced thereby.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ANSEL C. HULBERT.

Witnesses:

FRANCIS M. WRIGHT,
D. B. RICHARDS.