

No. 679,451.

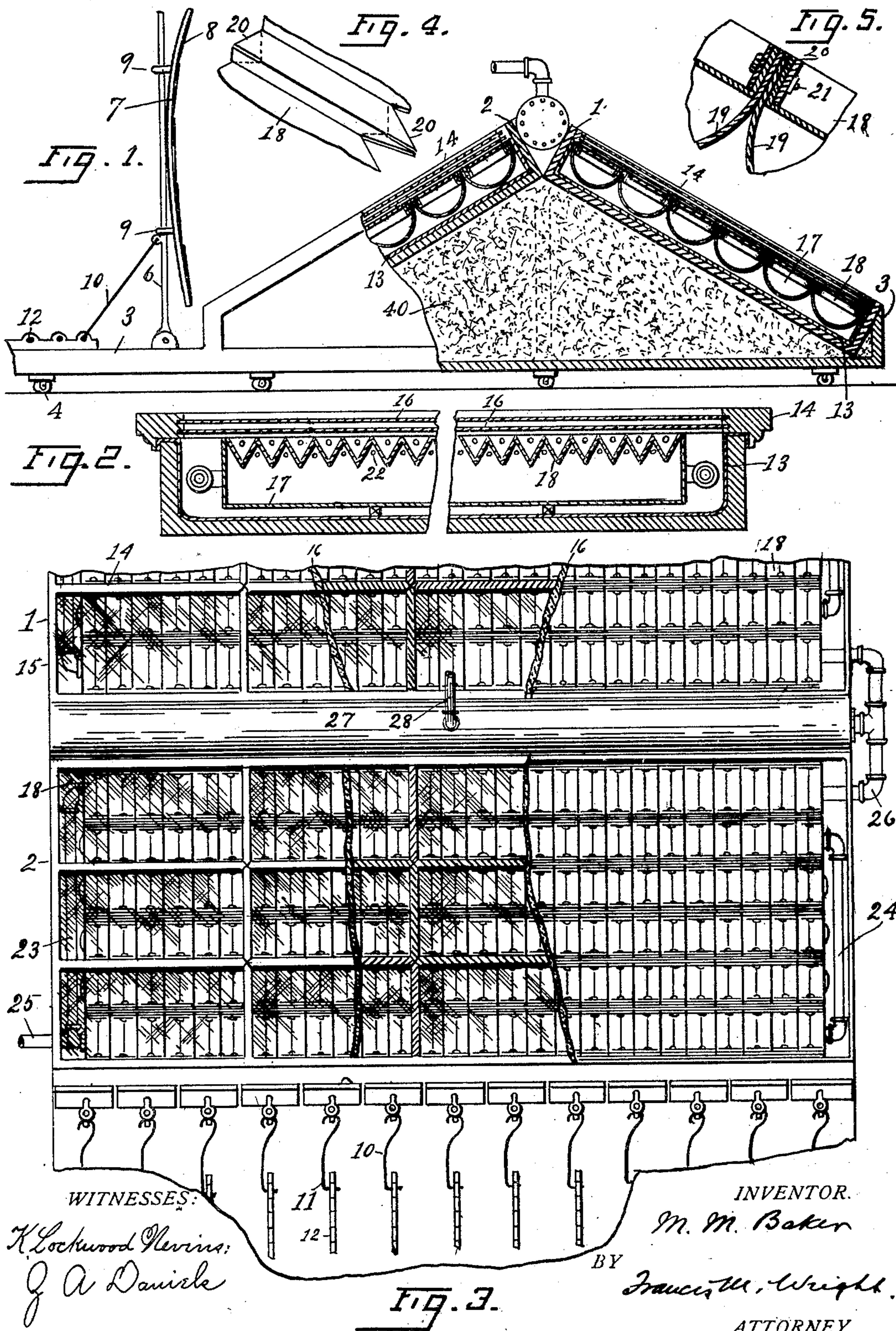
Patented July 30, 1901.

M. M. BAKER.

SOLAR WATER HEATER AND STEAM GENERATOR.

(Application filed Aug. 27, 1900.)

(No Model.)



UNITED STATES PATENT OFFICE.

MILTON M. BAKER, OF SAN FRANCISCO, CALIFORNIA.

SOLAR WATER-HEATER AND STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 679,451, dated July 30, 1901.

Application filed August 27, 1900. Serial No. 28,224. (No model.)

To all whom it may concern:

Be it known that I, MILTON M. BAKER, a subject of the Queen of Great Britain, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Solar Water-Heaters and Steam-Generators, of which the following is a specification.

My invention relates to improvements in solar water-heaters and steam-generators, the object of my invention being to provide an apparatus of a simple and inexpensive construction by means of which water may be heated and steam generated by the direct action of the rays of the sun.

My invention therefore resides in the novel construction, combination, and arrangement of parts for the above ends, hereinafter fully specified, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is an end elevation of my improved apparatus, certain parts being shown in sections. Fig. 2 is a broken longitudinal section of the heater proper on an enlarged scale. Fig. 3 is a broken plan view of the same, certain parts of the heater proper being broken away to show the interior construction. Fig. 4 is a perspective of a portion of the blank from which the top of the steam-generating tube is formed before the ends are bent up, and Fig. 5 is an enlarged view of two adjoining portions of the adjacent tubes.

Referring to the drawings, 1 2 represent boxes containing heaters, said boxes being mounted on a frame 3, movable on rollers 4. The boxes are set at an angle on said frame sloping in opposite directions, and the space below said boxes is filled with non-conducting material, as 4. Upon the frame 3 are pivotally supported a number of standards 6, which carry mirror-frames 7 and mirrors 8, said frames 7 being pivotally secured by eyes 9 upon said standards and said standards being secured at any desired inclination to the vertical by means of rods 10, having hooks 11 engaging eyes 12. The box 1 is intended to receive the direct solar rays, while the box 2 is arranged opposite to the mirrors 8 to receive the indirect rays reflected therefrom. By mounting the whole apparatus on rollers it can be turned to advantageously receive the morning or evening sun, as desired.

Each of the boxes 1 2 has a lining of felted wool 13 and a cover 14, said cover comprising a frame 15 and two thicknesses of glass 16, with an air-space therebetween. Air is a bad conductor of heat, and the above construction of cover prevents the heat from escaping by conduction. In said box are arranged a series of tubes 17, each tube being of a general semicylindrical form, and its top 18 having corrugations in a direction transverse to the tube. Each tube consists of a sheet of metal 19, bent into the half of a cylinder, and the upper edges of said sheet of metal are riveted to extensions or ears 20 of the top 18. Said top consists of a sheet of metal V-crimped in form and having between adjacent edges thereof, at each end, the extensions or ears 20, which when bent up overlap each other and lie against the upper edge of the semicylindrical sheet 19. A rivet 21 is driven through the two overlapping ears 20, then through the edges of two adjacent semicylindrical sheets 19, and then through the overlapping ears 20 of the top of the next tube. The ears 20 may be conveniently formed out of a blank, as shown in Fig. 4, and then bent up at right angles to the corrugations of the top, as shown in Fig. 5. The edges of the semicylindrical sheets 19 are perforated, as at 22, immediately beneath the ridges of the tubes to permit the hot water to flow from each tube to the next tube above it. In this way only the hottest water in each tube is carried onto the next tube above. To compensate for the flow of water upward through the perforations 22, there are provided return-pipes 23 24, the pipe 23 leading from the bottom of the uppermost tube at one end of the heater to the bottom of the lowest tube and the tube 24 leading from the tube next to the uppermost at the other end of the heater to the lowest tube. The inlet-pipes 25 enter the lowest tube of each box at one end, and the outlet-pipes 26 for the steam lead from a point near to the top of the uppermost tube at the other end into the steam-cylinder 27, from which the steam may be drawn off to the engine by the pipe 28.

The device may be used either for heating water or generating steam.

I claim—

1. A device of the character described, comprising a plurality of water-tubes each formed

of a sheet of metal bent into a substantially semicylindrical form and a top of metal having corrugations running transversely of the tube, adjacent tubes being connected by ap-
 5 ertures at the top beneath the ridges of the corrugations, and suitable return connections for the cold water between terminal pipes of the series, the whole inclosed in an air-tight chamber having its upper side transparent
 10 to the solar rays, substantially as described.

2. A device of the character described, comprising a plurality of water-tubes each of a general semicylindrical shape, with the rounded
 15 portion at the bottom, adjacent tubes being arranged with their upper edges in contact and having communicating perforations in said upper edges, and suitable return connections for the cold water between terminal
 20 pipes of the series, the whole inclosed in an air-tight chamber having its upper side transparent to the solar rays, substantially as described.

3. A device of the character described, comprising a plurality of water-tubes each hav-
 25 ing its bottom formed of a sheet of metal bent into a substantially semicylindrical form, its top formed of a sheet of metal V-cripped transversely to the tube, said top having be-
 30 tween adjacent ridges extensions or ears bent up at right angles to the corrugations and overlapping each other, and rivets through the ears of adjacent tops and the contiguous
 35 upper edges of adjacent bottoms, adjacent tubes being suitably connected, the whole inclosed in an air-tight chamber having its upper side transparent to the solar rays, sub-
 40 stantially as described.

4. A device of the character described comprising a series of parallel, elongated, sub-
 40 stantially horizontal, chambers, separated by partitions, the tops of said chambers having corrugations running transversely of the chambers, the partitions having perforations
 45 at the top beneath the ridges of the corrugations and above the depressions thereof, the whole inclosed in an air-tight chamber having its upper side transparent to the solar rays, a cold-water-supply pipe entering the
 50 lowest chamber, and a hot-water-outlet pipe from the uppermost chamber, substantially as described.

5. A device of the character described comprising a series of parallel, elongated, sub-
 stantially horizontal, chambers, separated by

partitions, the tops of said chambers having 55
 corrugations running transversely of the chambers, the partitions having perforations at the top beneath the ridges of the corrugations and above the depressions thereof and
 60 suitable return connections for the cold water between terminal pipes of the series the whole inclosed in an air-tight chamber having its upper side transparent to the solar rays, a cold-water-supply pipe entering the
 65 lowest chamber and a hot-water-outlet pipe from the uppermost chamber, substantially as described.

6. A device of the character described comprising a series of parallel, elongated, sub-
 70 stantially horizontal, chambers, separated by partitions, the tops of said chambers having corrugations running transversely of the chambers, the partitions having perforations at the top beneath the ridges of the corruga-
 75 tions, the whole inclosed in an air-tight chamber having its upper side transparent to the solar rays, a cold-water-supply pipe entering the lowest chamber and a hot-water-outlet pipe from the uppermost chamber, substan-
 80 tially as described.

7. A device of the character described comprising a frame, and two boxes arranged ob-
 85 liquely thereon, sloping in opposite directions, each box having an air-tight chamber exposed on one side to the rays of the sun, and a water-chamber in the air-tight chamber and a reflector arranged to reflect the so-
 lar rays into one of said boxes, substantially as described.

8. A device of the character described, com- 90
 95 prising a frame having two boxes arranged obliquely thereon and sloping in opposite directions, each box having an air-tight chamber exposed on one side to the rays of the sun, and a water-chamber in the air-tight
 100 chamber, a reflector arranged opposite to one of said boxes to direct the solar rays thereinto, and a steam-cylinder supported between the upper edges of the boxes, and connected with the water-chamber in each box, substantially as described.

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

M. M. BAKER.

Witnesses:

FRANCIS M. WRIGHT,
 K. LOCKWOOD NEVINS.