

(No Model.)

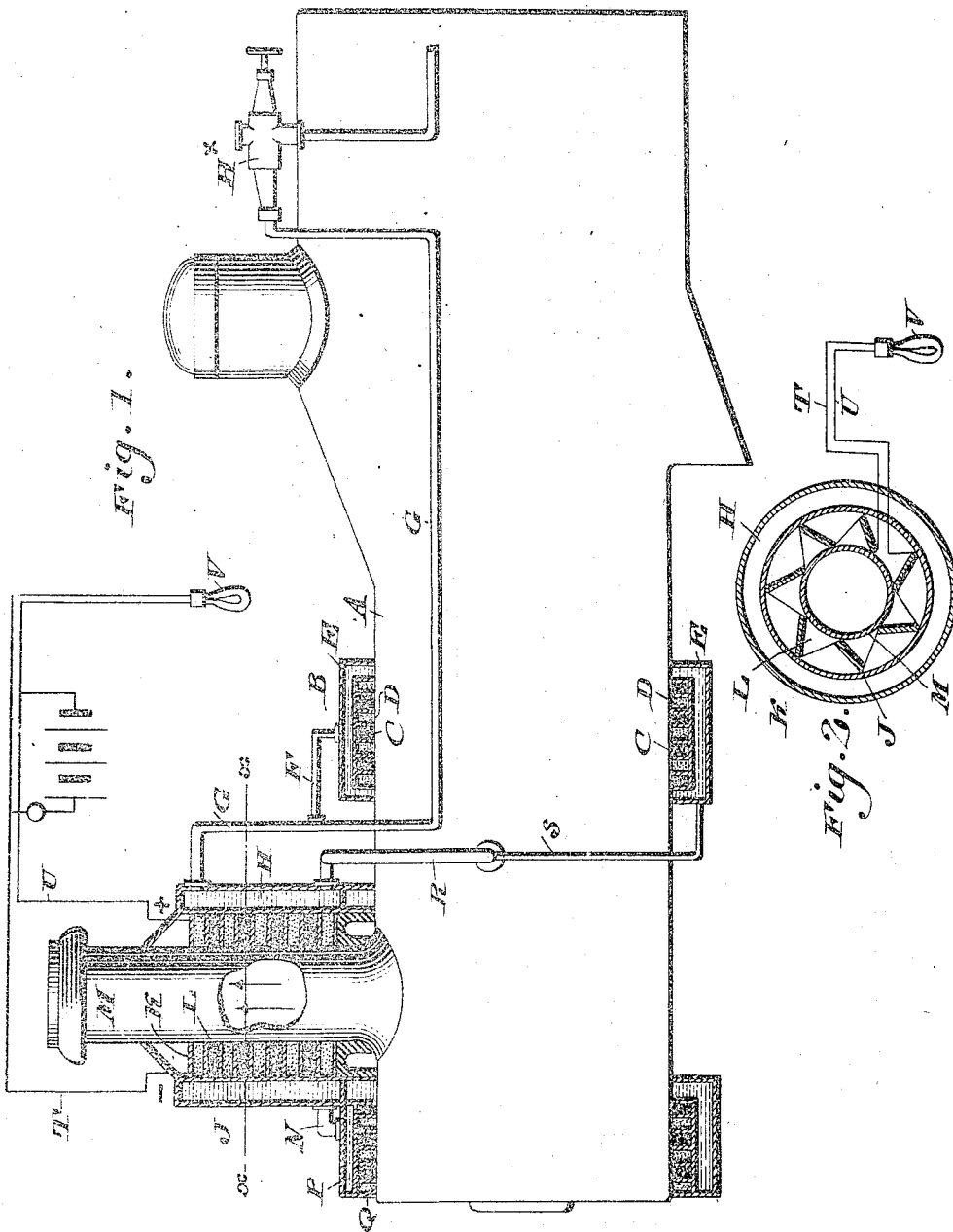
2 Sheets—Sheet 1.

H. C. REAGAN, Jr.

APPARATUS FOR APPLYING HEAT TO THERMO BATTERIES.

No. 585,229.

Patented June 29, 1897.



WITNESSES:

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INVENTOR

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

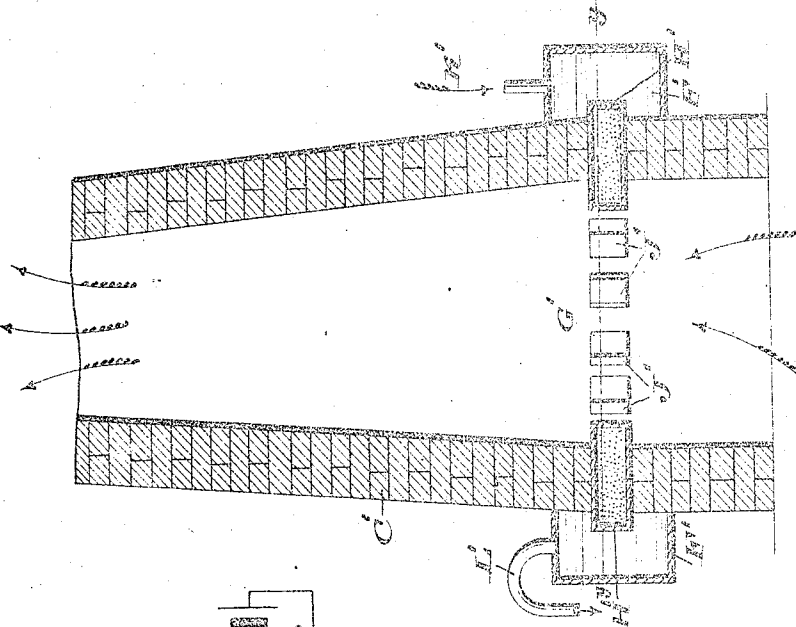
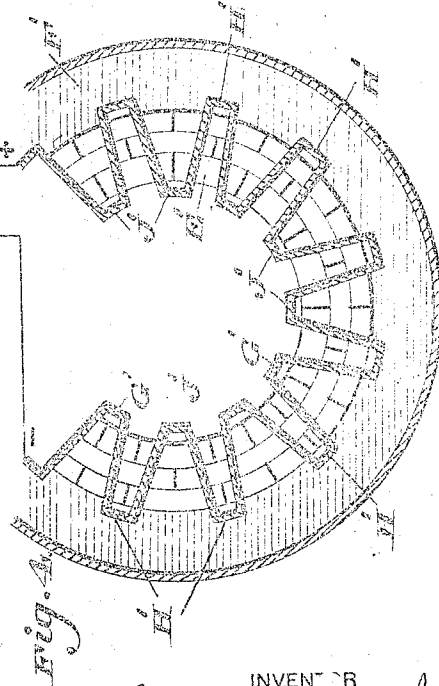
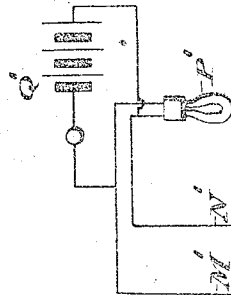
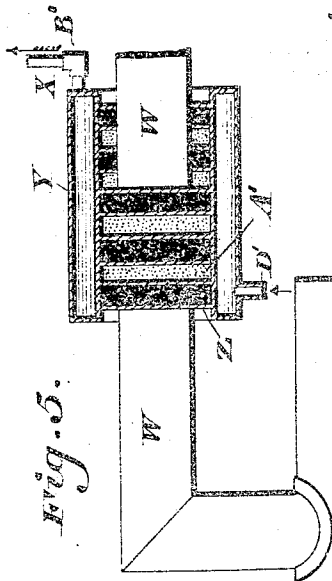


Fig. 5.



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UNITED STATES PATENT OFFICE.

HARRY C. REAGAN, JR., OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR APPLYING HEAT TO THERMO-BATTERIES.

SPECIFICATION forming part of Letters Patent No. 585,229, dated June 29, 1897.

Application filed May 15, 1896. Serial No. 591,733. (No model.)

To all whom it may concern:

Be it known that I, HARRY C. REAGAN, JR., a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Applying Heat to Thermo-Batteries, which improvement is fully set forth in the following specification and accompanying drawings.

It is a well-known fact that when two metals are joined so that several joints or junctions exist in an element if one of said joints is heated from any source and the other cooled there will arise a difference of potential electromotive force, and thus a current of electricity will be caused to flow, the metals ordinarily employed being antimony and bismuth, although many others are affected in the same way.

The object of the present invention is to utilize what is to-day considered as lost heat and to provide means for applying said heat to thermo-batteries of the character above referred to, the heat ordinarily lost being thus effectively utilized, while the source of heat radiated may be the steam-pipe, steam-boiler, or stack, suitable means being provided, as a water-jacket or other equivalent device, for cooling the exterior of the thermo-couples.

It further consists of novel details of construction, all as will be hereinafter set forth, and specifically pointed out in the claims.

Figure 1 represents a sectional view of a series of thermo-batteries applied to the body, stack, and smoke-box of a locomotive-boiler embodying my invention. Fig. 2 represents a horizontal section on line *x x*, Fig. 1, showing the relative position of the thermo-couples to the source of heat, which in the present instance is the stack. Fig. 3 represents a vertical sectional view of a portion of a stack or chimney into which hot gases or products of combustion are conducted, showing also a series of thermo-couples located therein and means for cooling the exterior of the same. Fig. 4 represents a horizontal section on line *y y*, Fig. 3. Fig. 5 represents a side elevation of a portion of a locomotive-boiler and a steam-main or outlet-pipe, showing the thermo-couples mounted thereupon.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings, A designates a shell of a locomotive or other boiler, the same having mounted thereon the thermo-battery B and its adjuncts, the same consisting of the thermo-couples C and D, which are made of any suitable pair of metals, as antimony and bismuth, and are properly assembled and insulated, the inner junctions of said couples bearing upon the boiler-shell, while their outer junctions are in contact with the water-jacket E, which surrounds the aforesaid couples, water being conducted into said jacket through the branch F, which leads from the feed-pipe G, which latter is connected with an injector H^x, which may be of usual construction and under the control of the engineer, said pipe G in the present instance leading to the jacket H, which surrounds the thermo-batteries J, which are constructed of the dissimilar elements K and L, the inner junctions of which latter are heated by their contact with the smoke-stack M, while their outer junctions are cooled by said water-jacket H, as is evident, the relative position of the above parts being indicated in Fig. 2.

N designates a pipe or conduit leading from the jacket H to the jacket P, which surrounds the thermo-couples Q, which are of the same construction as has been hereinbefore described, the said jacket P and the couples Q surrounding the smoke-box of the boiler A, whereupon it will be seen that practically all the heat units which are ordinarily wasted or lost through radiation are by my invention utilized.

R designates a pipe leading from the jacket H to the interior of the boiler, while the pipe S serves as an outlet-pipe for conducting the water from the interior of the jacket E to said pipe R or to the interior of the boiler, it thus being evident that the water-jackets employed serve as feed-water heaters.

T and U designate conductors leading from opposite poles of the thermo-couples and connected with a lamp V, or it is evident that the same may be connected with a storage battery, if so desired.

It will be evident that in place of utilizing the radiated heat from the stack M the heat radiated from a steam-main or outlet-pipe W may be utilized, as shown in Fig. 5, said main, having mounted thereupon the thermo-cou-

ples Z A', whose inner junctions bear upon said steam-pipe, while their outer junctions are provided with a cooling-jacket Y, the cooling medium being conducted thereinto through the pipe D' and flowing therefrom through the pipe B'.

Referring now to Figs. 3 and 4, C' designates a stack through which products of combustion are discharged from any suitable source, as indicated by the arrows, said stack having located therein the thermo-couples G', which have their outer junctions H' located within the tank or water-jacket F', which surrounds the aforesaid stack, while their inner junctions J are located in the path of the said products of combustion and thereby subjected to the heat thereof, said heat also entering the pockets E', formed in said couples.

K' designates an inlet-pipe, whereby a cooling fluid is conducted to the jacket F', said cooling fluid having its exit through the discharge-pipe L'.

M' and N' designate a series of conductors which are connected to the proper opposite poles of the thermo-couples, and may lead by the proper connections to the lamp P' or to a storage battery Q', as will be evident from Fig. 4.

The operation will now be apparent to those skilled in the art, the application of the heat ordinarily lost by radiation to the inner junctions of the thermo-couples and the application of the cooling device to the outer junctions of said couples causing a current of electricity to flow, the same being utilized for lighting purposes, as in and around an engine-house or roundhouse, or for a storage battery or any other similar purpose as may be desirable, it being apparent that the heat ordinarily wasted is effectively utilized.

It will be evident that I may make the thermos in sections, so that the same may be readily applied to or removed from a locomotive or the stack or smoke-box thereof.

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

1. The combination with a locomotive-boiler, carrying a pumping device and having a stack and smoke-box, of a thermo-battery surrounding said smoke-box, a water-jacket surrounding said battery, a connection intermediate said pumping device and water-jacket and an overflow or outlet for the latter.

2. The combination with a locomotive-boiler, carrying a pumping device and having a smoke box and stack at its forward end, of thermo-batteries, surrounding said smoke box and stack, and having their inner junctions in contact therewith, water-jackets surrounding each of said batteries and in contact with the latter, a pipe intermediate said jackets, a pipe leading from one of the latter to the boiler, and a pipe intermediate one of said jackets and said pumping device.

3. The combination with a boiler of a thermo-battery surrounding a suitable portion of the latter and adapted to be heated by the gases which ordinarily are wasted, a water-jacket surrounding said battery, means for forcing water into said jacket, and means for conducting the heated water from said jacket to the interior of said boiler, said jacket thus serving the function of a feed-water heater.

4. The combination with a locomotive-boiler having a pumping device thereon, of thermo-batteries mounted on the smoke-box, stack, and body of said boiler, water-jackets surrounding said thermos and in communication with each other, a connection from said pumping device to one of said jackets, and a connection from one of the latter to the interior of the boiler said jacket thus serving as a feed water heater.

5. The combination with a locomotive-boiler provided with a smoke-box, of a thermo-battery surrounding said smoke-box, a cooling device surrounding said battery, and means for causing a circulation through said device.

HARRY C. REAGAN, JR.

Witnesses:

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