

H. W. JACOBS.

SUPERHEATER.

APPLICATION FILED AUG. 31, 1908.

948,331.

Patented Feb. 8, 1910.

4 SHEETS—SHEET 1.

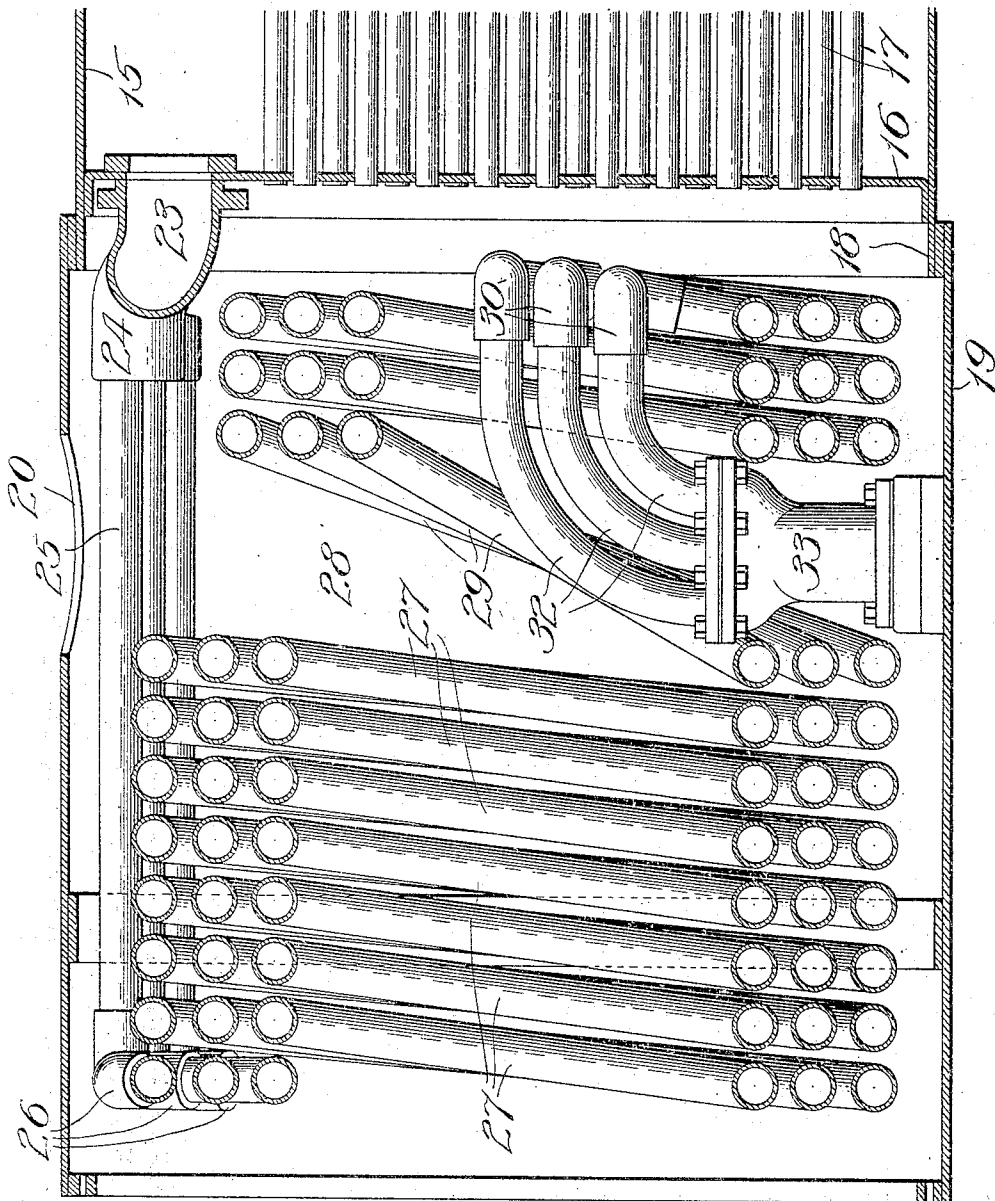


Fig. 1.

Witnesses:

John Enders
Chas. H. Bull.

Inventor:

Henry W. Jacobs.

By Sheridan & Wilkinson
Attys #

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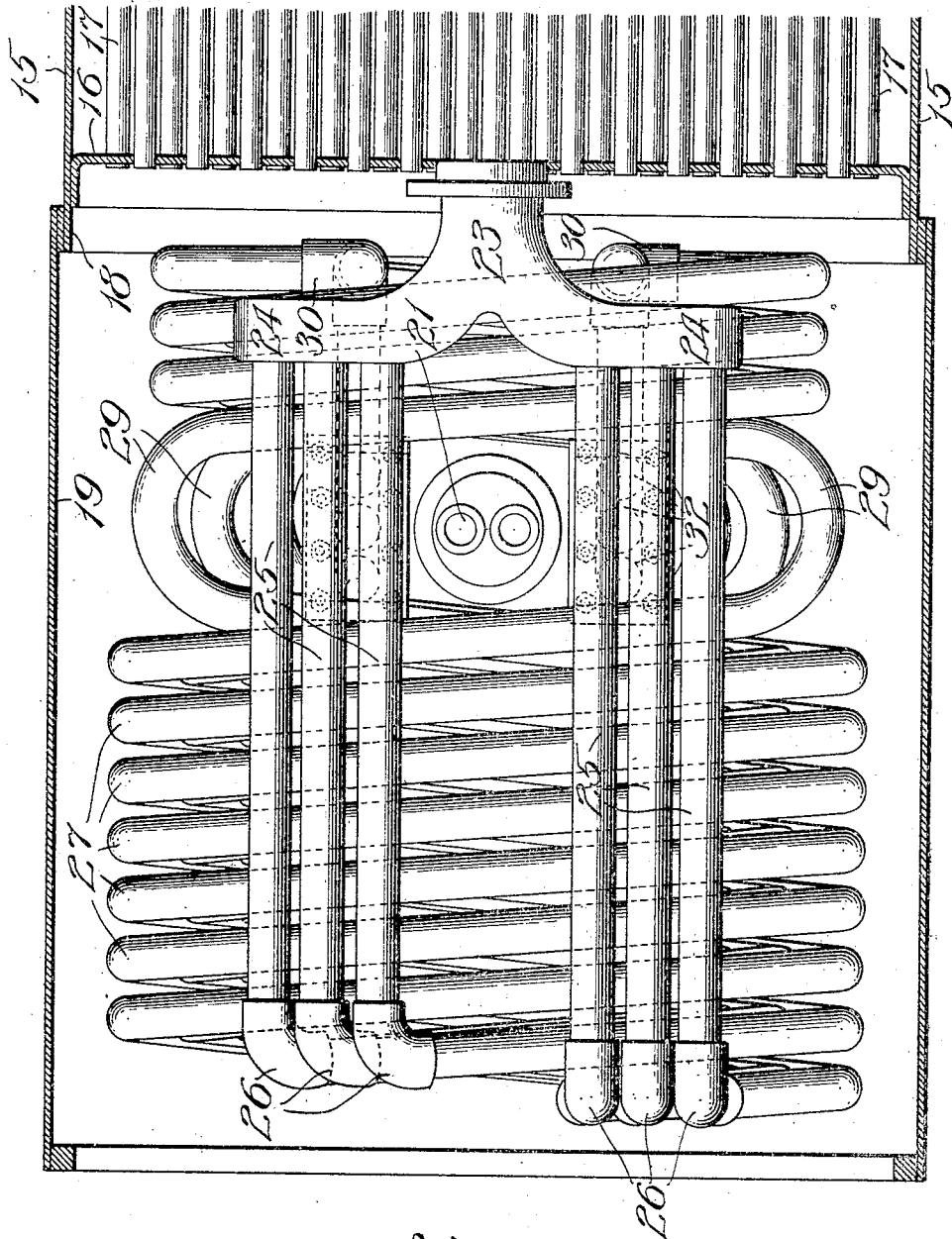


Fig. 2.

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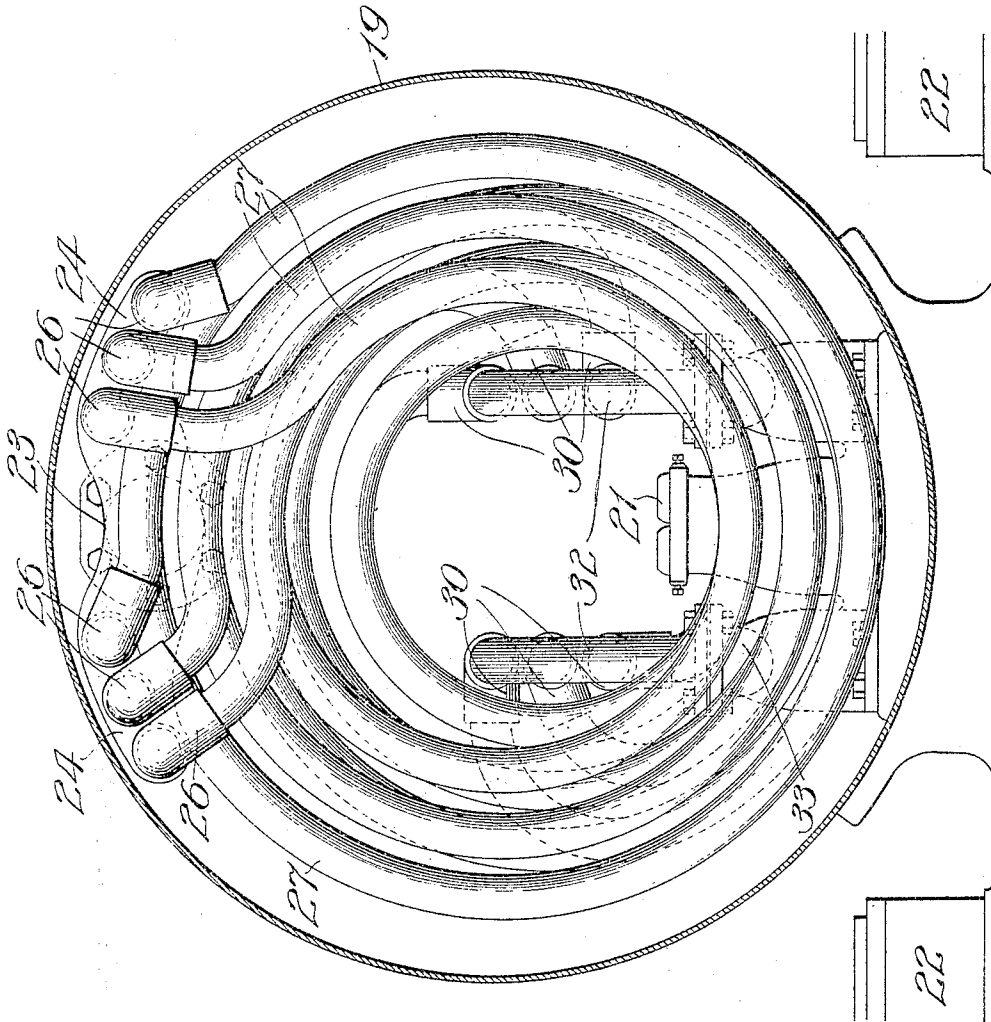


Fig. 3.

Witnesses:

John Enders
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Inventor:

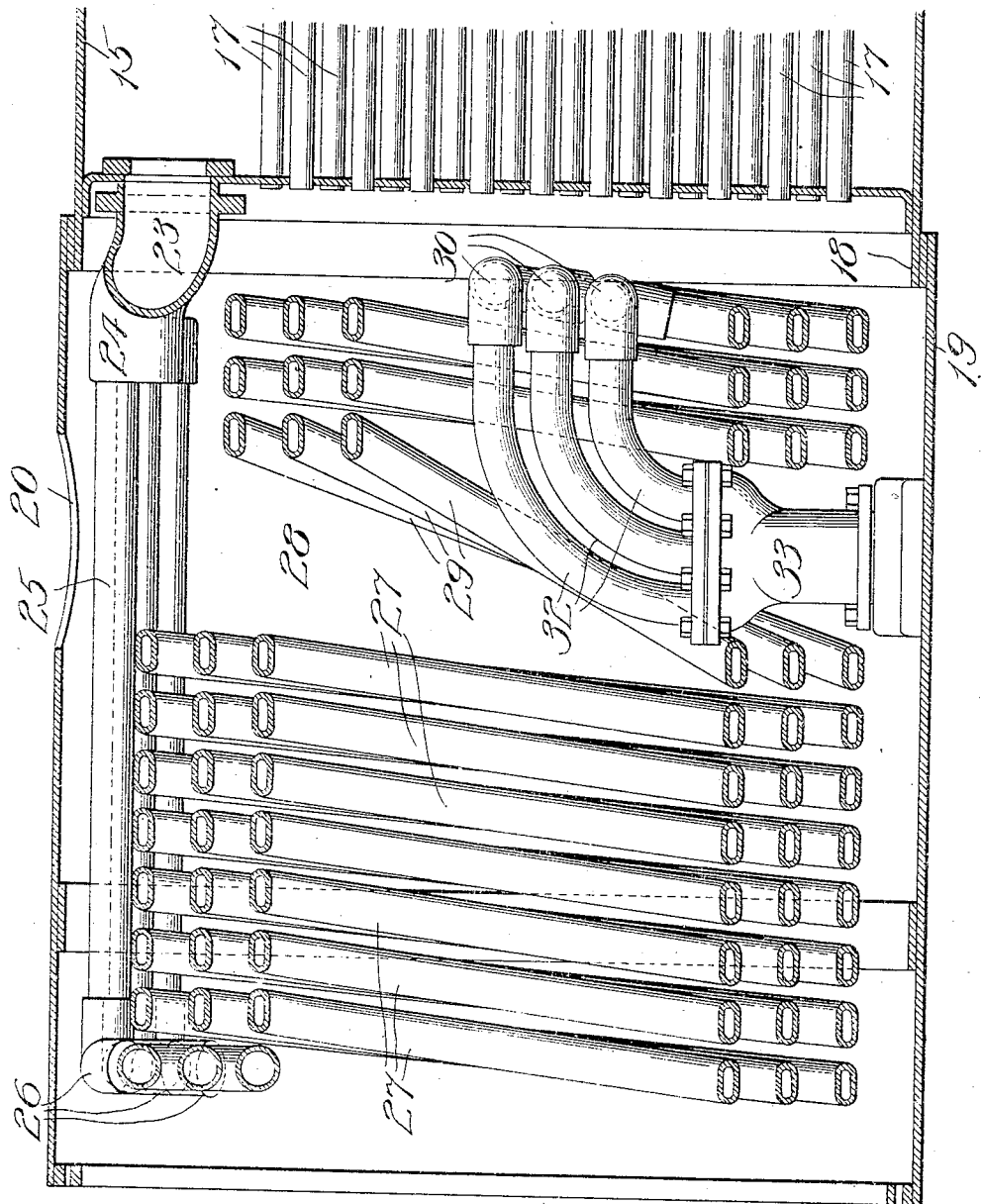
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4 SHEETS—SHEET 4.



Witnesses:
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 Chas. H. Bull

Fig. 4.

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UNITED STATES PATENT OFFICE.

HENRY W. JACOBS, OF TOPEKA, KANSAS.

SUPERHEATER.

948,331.

Specification of Letters Patent.

Patented Feb. 8, 1910.

Application filed August 31, 1908. Serial No. 451,098.

To all whom it may concern:

Be it known that I, HENRY W. JACOBS, citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented certain new and useful Improvements in Superheaters, of which the following is a specification.

The object of my invention is to provide a new and improved superheater adapted to be placed within the smoke box of a locomotive.

A further object of my invention is to provide such a superheater that shall not obstruct the blast of exhaust steam through the smoke box.

Still another object is to so arrange the superheater that the hottest gases shall come in contact with pipes containing the hottest steam.

Still other objects are to make a superheater that can be constructed with little machine work; that shall be inexpensive to build, easy to maintain, easy to install or remove; and that shall permit access to the ends of the flues in the front flue sheet for purposes of cleaning or repairing.

All these objects and others will be made apparent in the following specification and claims when taken in connection with the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of a smoke box and the superheater contained therein. Fig. 2 is a horizontal section of the smoke box showing a plan view of the superheater therein, and Fig. 3 is a front elevation of the superheater, the smoke box being shown in section. Fig. 4 is a view showing a modification.

In the particular embodiment of my invention which I have chosen to illustrate in the accompanying drawings, the shell 15 of the locomotive boiler is closed across the front by the flue sheet 16, in which the ends of the flues 17 are expanded in the usual manner. The boiler shell 15 projects forward, as indicated by the reference numeral 18, and to it is attached the forwardly extending smoke box shell 19. In the top of this is an opening 20 for the smoke stack. At the bottom of the smoke box is the exhaust nozzle 21 directed toward the smoke stack. Exhaust passages lead directly from the steam chests 22 to this exhaust nozzle 21.

At the point where the steam pipe passes through the front flue sheet it is connected to the header 23, which has branches 24 ex-

tending on each side within the top of the smoke box. From these branch headers 24, three straight horizontal tubes 25 extend forward on each side. At their forward ends are elbows 26 which connect to the helically wound tubes 27. These tubes are wound backward toward the front flue sheet 16, the tubes branching from each side of the headers 24 being arranged in alternate layers. At a point in the same transverse plane with the exhaust nozzle 21 and the smoke stack opening 20, the tubes 27 are carried back on each side of the smoke box obliquely, as indicated by the reference numeral 29, so as to leave an open space 28 to accommodate the exhaust nozzle 21 and permit the blast therefrom to be directed toward the smoke stack opening 20. From this point the helical bank of tubes 27 continues toward the flue sheet 16. Finally, at points on each side the tubes 27 end in elbows 30 and from these elbows short bent tubes 32 extend to the headers 33 on each side, from which connections are made in the usual manner to the steam chests 22. It will be observed that the course of the steam from the boiler is through the header 23 where it divides going to the branches 24 and thence to the forward end of the smoke box along the straight tubes 25. From this point the course of the steam is back through the helical tubes 27 to a point in proximity to the flue sheets 16, whence the pipes 32 conduct it to the respective steam chests 22. It will be observed that the spacing apart of the layers of the helical bank of tubes so as to leave the open space 28 affords a free and unobstructed passage for the exhaust steam blast. The steam flows in the course of tubes back toward the front flue sheet, so that the hottest steam is subjected to the hottest flue gases. There are very few castings in the apparatus and there are no large bulky headers. The apparatus can be easily installed through the front end of the smoke box or withdrawn therefrom. Through the central axial opening in the helical bank of tubes 27 a workman can readily get access to the ends of the flues for the purpose of repairing or cleaning them. The elbows 26 and 30 are preferably autogenously welded to the pipes so that the whole apparatus is very secure against leakage or other break down.

Fig. 4 is a view corresponding to Fig. 1, but showing a modification in which the use of flattened tubing is disclosed, whereby the

steam flows in a thin stream, and has a greater area of contact with the heating surfaces.

I claim:

5 1. A locomotive smoke box superheater comprising an inlet header adjacent to the front flue sheet, a plurality of straight tubes leading forward therefrom to the front end of the smoke box, a plurality of helical
10 tubes having a common axis leading thence back to a point adjacent the flue sheet, and connections therefrom to the locomotive steam chests.

2. A locomotive smoke box superheater
15 comprising a T-head projecting through the front flue sheet at the upper part thereof, a plurality of tubes extending forwardly from each branch of the T-head on the respective sides of the smoke box, helical tubes extending
20 thence around the walls of the smoke box toward the rear end thereof, and connections from the rear ends of said tubes to an outlet header.

3. A locomotive smoke box superheater
25 comprising a bank of helical tubes extending adjacent to the walls of the smoke box, the convolutions thereof being close together except in proximity to the exhaust nozzle at which point they are spaced apart above
30 and below.

4. A locomotive smoke box superheater comprising two sets of tubes wound in alternate layers in helices having a common horizontal axis, the tubes of one set leading to
35 the steam chest on one side of the locomotive and the tubes in the other set leading to the steam chest on the other side of the locomotive.

5. A locomotive smoke box, an exhaust
40 nozzle projecting upwardly from the lower

part thereof, headers on each side thereof connecting with passages to the respective steam chests, and a plurality of helically wound tubes leading from the boiler steam space to said headers.

6. A locomotive smoke box superheater comprising a plurality of flattened helical tubes connected at one end to the steam pipe at the upper part of the front flue sheet and at the other end to a header leading to the
50 steam chests at the lower part of the smoke box.

7. A locomotive smoke box superheater comprising a T-head projecting through the front flue sheet at the upper part thereof, a
55 plurality of tubes extending forwardly from the T-head in the upper part of the smoke box, helical tubes extending thence around the walls of the smoke box toward the rear end thereof, and two headers in the
60 bottom of the smoke box on respective sides thereof, said helical tubes ending in said headers.

8. A locomotive smoke box superheater comprising a bank of helical tubes extending
65 adjacent to the walls of the smoke box, the pitch of part of said tubes being increased decidedly at one side of the exhaust nozzle, and the pitch of the remaining tubes being increased on the opposite side of the
70 exhaust nozzle so as to leave open spaces above and below for the exhaust nozzle and the smoke stack opening.

In testimony whereof, I have subscribed my name.

HENRY W. JACOBS.

Witnesses:

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