(No Model.)

2 Sheets—Sheet 1.

C. SCHAEFER.

STEAM BOILER.

No. 437,384. Patented Sept. 30, 1890.

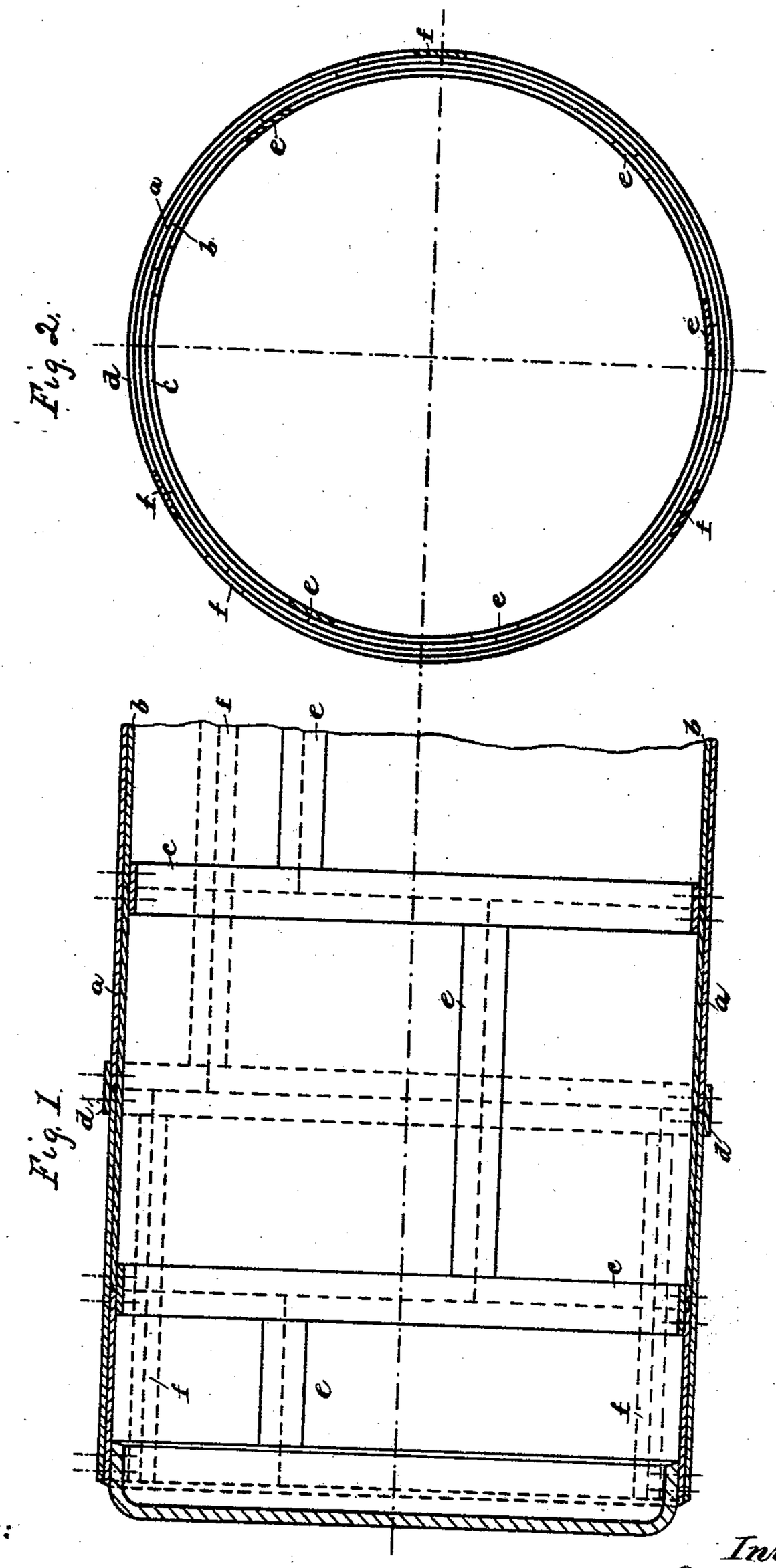

Fig. 2.

Fig. 1.

Witnesses:

Chas. F. Barter.

Charles R. Seale.

Inventor:

Carl Schaefer

by his attorney

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(No Model.) 2 Sheets—Sheet 2.

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STEAM BOILER.

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Fig. 4.

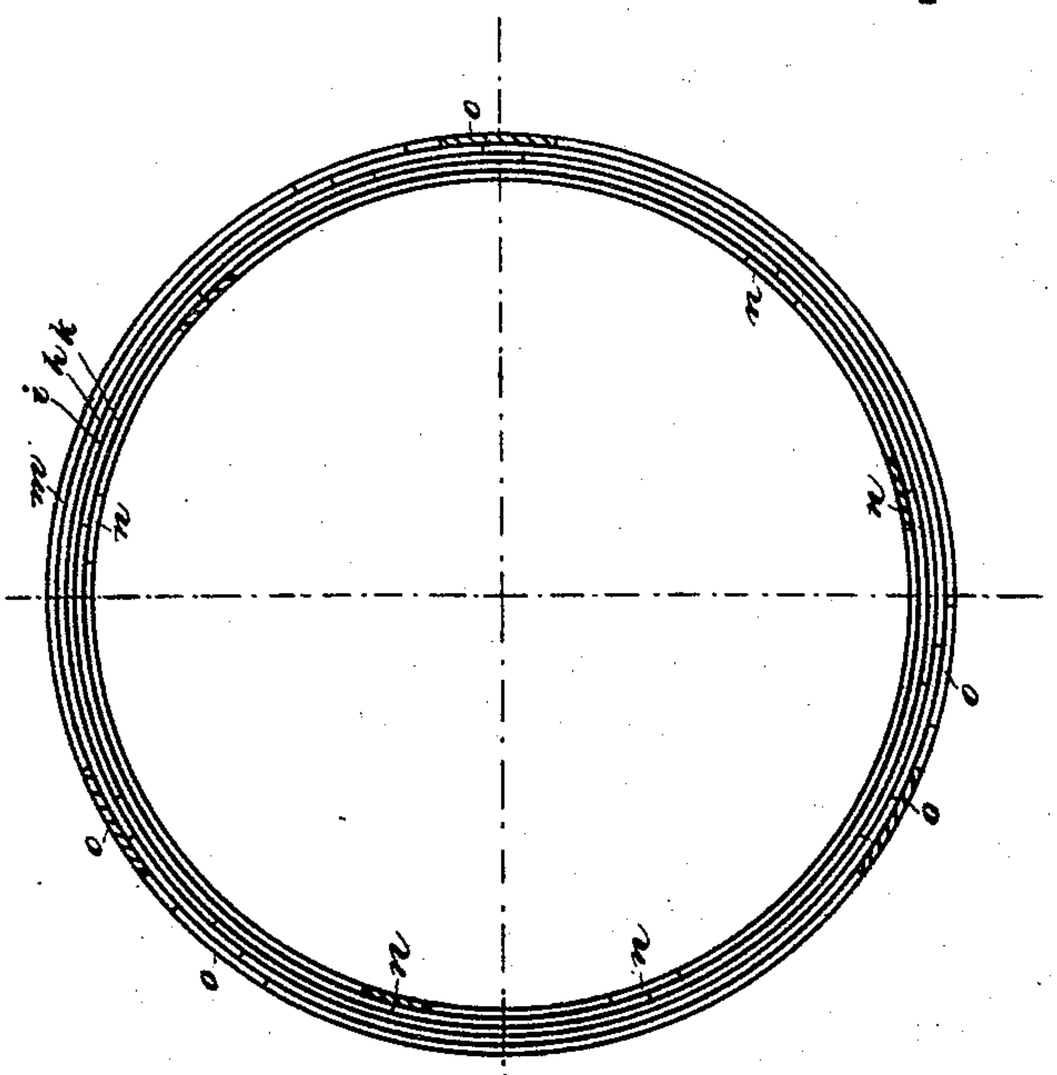
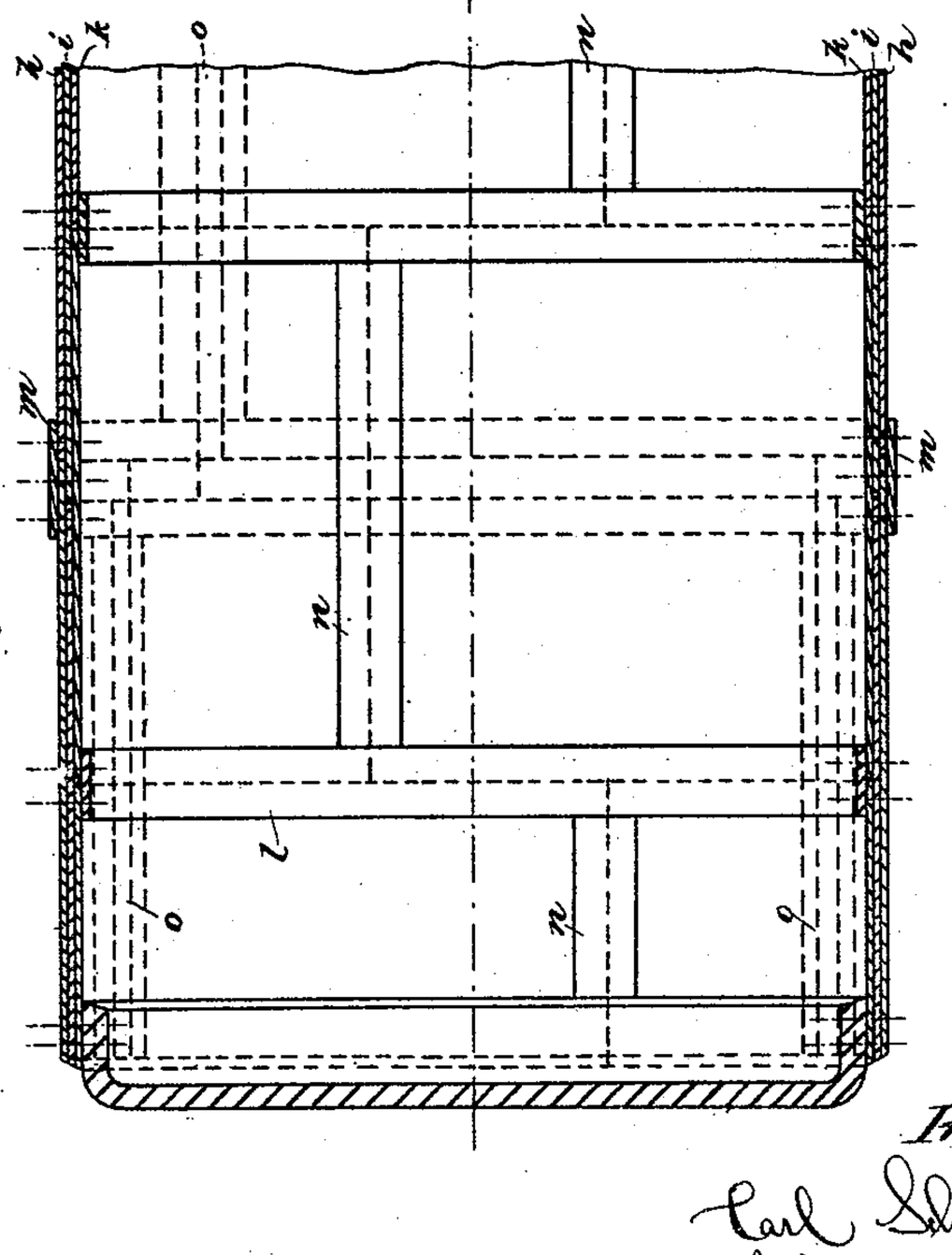


Fig. 3.



Witnesses:

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Charles R. Seale.

Inventor:

Carl Schaefer
by his attorney
Thomas Drew Stetson

UNITED STATES PATENT OFFICE.

CARL SCHAEFER, OF OBERHAUSEN, GERMANY.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 437,384, dated September 30, 1890.

Application filed April 26, 1889. Serial No. 308,726. (No model.)

To all whom it may concern:

Be it known that I, CARL SCHAEFER, a subject of the Emperor of Germany, residing at Oberhausen, in the country of the Rhine, in the Kingdom of Prussia, in the Empire of Germany, have invented a certain new and useful Improvement in the Construction of Steam-Boilers, of which the following is a full and exact description.

This invention relates to an improvement in boilers, and is based upon the following motives—that is to say, it is a fact well known that the ever-increasing tension of steam required for steam-boilers, and more particularly for marine boilers, necessitates the employment of sheet-iron of such a thickness as will render it impossible, or nearly impossible, to work the said sheet-iron into boilers by means of the usual appliances as now commonly in use in even the larger boiler-factories. Moreover, it is known that in bending into the shape of boilers sheet metal of great or uncommon thickness the material of said metal is apt to become distorted and strained by reason of the exterior fibers more distant from the neutral layer being stretched too much, while the layer of fibers on the interior surface are jolted in too high a degree, so that the resistability of the sheet metal, after bending the latter into form, is materially diminished and impaired. Finally, it is to be remarked that the cost of sheet metal increases in an undue measure or proportion with the higher weight due to the increasing thickness.

Now, in order to obviate the above difficulties, it is proposed in accordance with the present invention to employ for the casings of boilers or other vessels intended for high pressure, in lieu of one plate of sheet metal having the required final thickness of the boiler two or more superposed sheet-metal plates of reduced thickness, so that the several combined thicknesses of the said several plates will equal the thickness which the one sheet-metal plate would have to have if such single plate had been used for the construction of the boiler. If, for instance, a boiler-casing were to have a thickness of two inches, then, according to the present invention, instead of one metal plate having said thickness two sheets of one inch each, or three sheets of two-thirds inch each, or four sheets of one-half inch each, would have to be taken and connected together in a suitable manner. Connecting said sheet-metal plates is preferably effected so that the one plate will cover up the joint between two other plates, and that the said joint is at the same time connected by means of a riveted fish-plate. Moreover, it is deemed advisable to provide with suitable fish-plates all the circumferential circular and longitudinal joints on the outside and the longitudinal joints on the inside of the boiler, the circular joints on the interior requiring to be covered up by a fish-plate only in case of extremely high pressure being employed.

Figure 1 is a longitudinal section of my improved boiler. Fig. 2 is a cross-section through Fig. 1. Fig. 3 is a longitudinal section of a modified form thereof. Fig. 4 is a cross-section through Fig. 3.

Referring first to the steam-boiler indicated in Figs. 1 and 2, it will be noticed that the said boiler is provided with a casing formed by two superposed sheet-metal plates *a* and *b*. *c c* designate interior, and *d d* exterior, fish-plates for the circular joints, while *e e* are interior, and *f f* exterior, fish-plates for the longitudinal joints.

Referring next to Figs. 3 and 4, the boiler therein illustrated is composed of a casing consisting of three superposed sheet-metal plates *h*, *i*, and *k*, and fish-plates *l*, *m*, *n*, and *o*, for the interior, intermediate, and exterior circular and longitudinal joints.

It will be readily seen that the boilers constructed as herein described consist of a casing having, as it were, no joint at all, there being, in fact, no joint entering the said casing further than to one-half or to one-third, &c., of the thickness of the metal. Moreover, it is evident that considering the fact according to which the entire length and width of each metal plate is always covering up the joint of the adjacent plates, a more reliable connection of the several plates, as well as a more perfect closing up of the joints, is insured by reason of the broader cover surrounding the said joints.

By means of the above arrangements I am

enabled to increase to any desired thickness the casings of steam-boilers without at the same time resorting to the use of sheet-metal plates of proportionately-increasing thickness, and thus to produce from relatively thin plates boilers having large diameters and apt to sustain the highest possible pressure, it being noticed that the manufacture of such boilers and the working of the thin plates and boiler-casings by means of the plant and appliances as heretofore and now in use in the boiler-workshops cannot meet with any difficulties.

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

Riveted boilers, and the like, the casings of which are composed of two or more superposed separate sheet-metal plates, arranged so that the joint between two such plates is covered by one or more of the adjacent plates of the casing, the said latter plates doing at the same time the office of fish-plates, in combination with additional narrow fish-plates applied on the exterior or interior or both, and strengthening both the lengthwise and circumferential joints, the said arrangement resulting in the production of a boiler-casing having joints whose depths amount only to a small fraction of the entire depth or thickness of the casing, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand this 21st day of March, 1889, in the presence of two subscribing witnesses.

CARL SCHAEFER.

Witnesses:
HERMANN KUHFUS,
EDUARD WEINREICH.