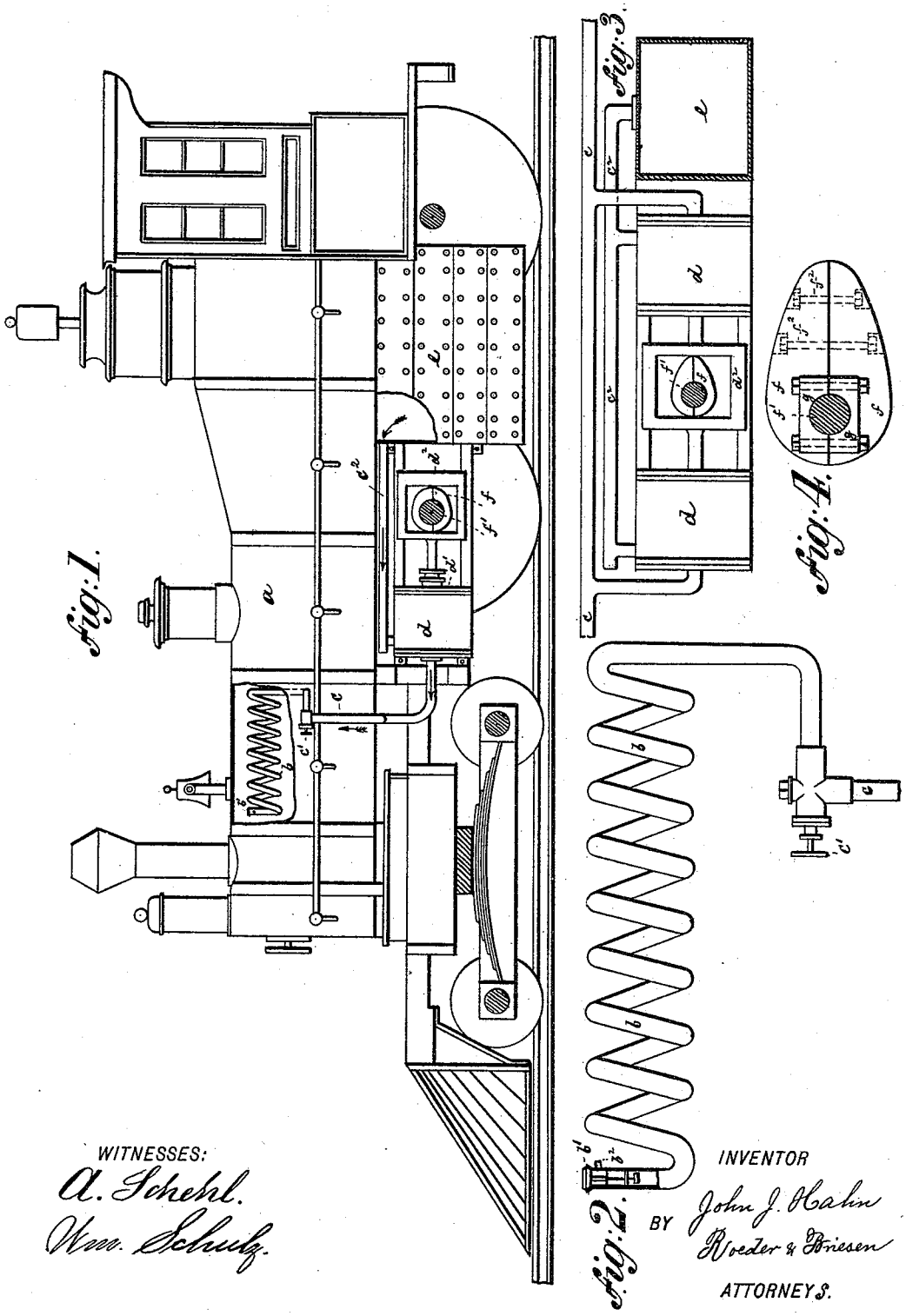
(No Model.)

J. J. HAHN.

STEAM BOILER.

No. 499,828. Patented June 20, 1893.



WITNESSES:
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UNITED STATES PATENT OFFICE.

JOHN J. HAHN, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO ADOLPH SCHINKEL, OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 499,828, dated June 20, 1893.

Application filed November 5, 1892. Serial No. 451,034. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. HAHN, of New York city, New York, have invented an Improved Steam-Boiler, of which the following is a specification.

This invention relates to a steam boiler which is so constructed that a volume of hot air is forced under pressure into the water chamber above the surface of the water. This compressed hot air serves a double purpose, first, to aid in heating the water and secondly to hold the damp steam down and to thus increase the effect of the fire upon the water.

The invention is particularly applicable to locomotive boilers, because more power is developed within the same size of boiler, but the invention may be applied to boilers generally.

In the accompanying drawings: Figure 1 is an elevation partly in section of a locomotive provided with my improved boiler. Fig. 2 is a detail side view of the coil *b;* Fig. 3 a side view partly in section of a double acting pump for forcing the hot air into the coil and Fig. 4 an elevation of cam *f*, with the axle *f'* in section.

The letter *a*, represents a tubular or other boiler, within which there is contained a coil *b*. This coil is placed within the upper part of the boiler and above the water level. The coil *b*, is connected by a pipe *c*, to a warm air supply such as the fire box *e*, of a locomotive. The pipe *c*, is provided with a stop cock *c'*, and enters one of the cylinders *d*, of a pump, which is also connected by pipe c^2, with the fire box *e*. The piston *d'*, of the pump is driven by a cam or eccentric *f*, on the axle *f'*, of the locomotive which engages a slide or cross head d^2, of the piston. The construction of the cam is best shown in Fig. 4. It is composed of two sections keyed around the axle *f'*, by countersunk bolts f^2, while collars *g*, serve to hold the cam in place. The pump will draw hot air from the fire box through pipes c^2, *c*, into the coil *b*. Here the compressed hot air is further heated to assume about the temperature of the boiler. From the coil *b*, the compressed hot air escapes into the boiler by raising a valve *b'*, located within the discharge end of the coil. The compressed hot air will thus form a hot cushion over the water level to hold the water down, *i. e.* prevent the rising of damp steam and it will also serve to heat the water. Thus the efficiency of the boiler is increased and fuel is economized. If the pressure in the boiler exceeds the pressure in the coil, the valve *b'*, will be closed and the supply of hot air will be cut off, excepting a small quantity escaping through an opening b^2.

In Fig. 3 I have shown a double acting pump having two cylinders *d*, so that compressed hot air is forced into the coil or coils at each partial stroke of the piston.

What I claim is—

1. The combination of a steam boiler with a coil placed within the upper part of the boiler shell above the water level and with a pump for forcing compressed hot air through the coil and into the boiler substantially as specified.

2. The combination of a steam boiler with an inclosed coil, a driving shaft, a cam mounted thereon, a pump operated by the cam and with a pipe that connects the pump with the coil, substantially as specified.

3. The combination of a steam boiler having a fire box with an inclosed coil, a valve controlling the discharge opening of the coil, a driving shaft, a cam mounted thereon, and with a pump operated by the cam and connected to the coil and to the fire box, substantially as specified.

JOHN J. HAHN.

Witnesses:
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