

(No Model.)

2 Sheets—Sheet 1.

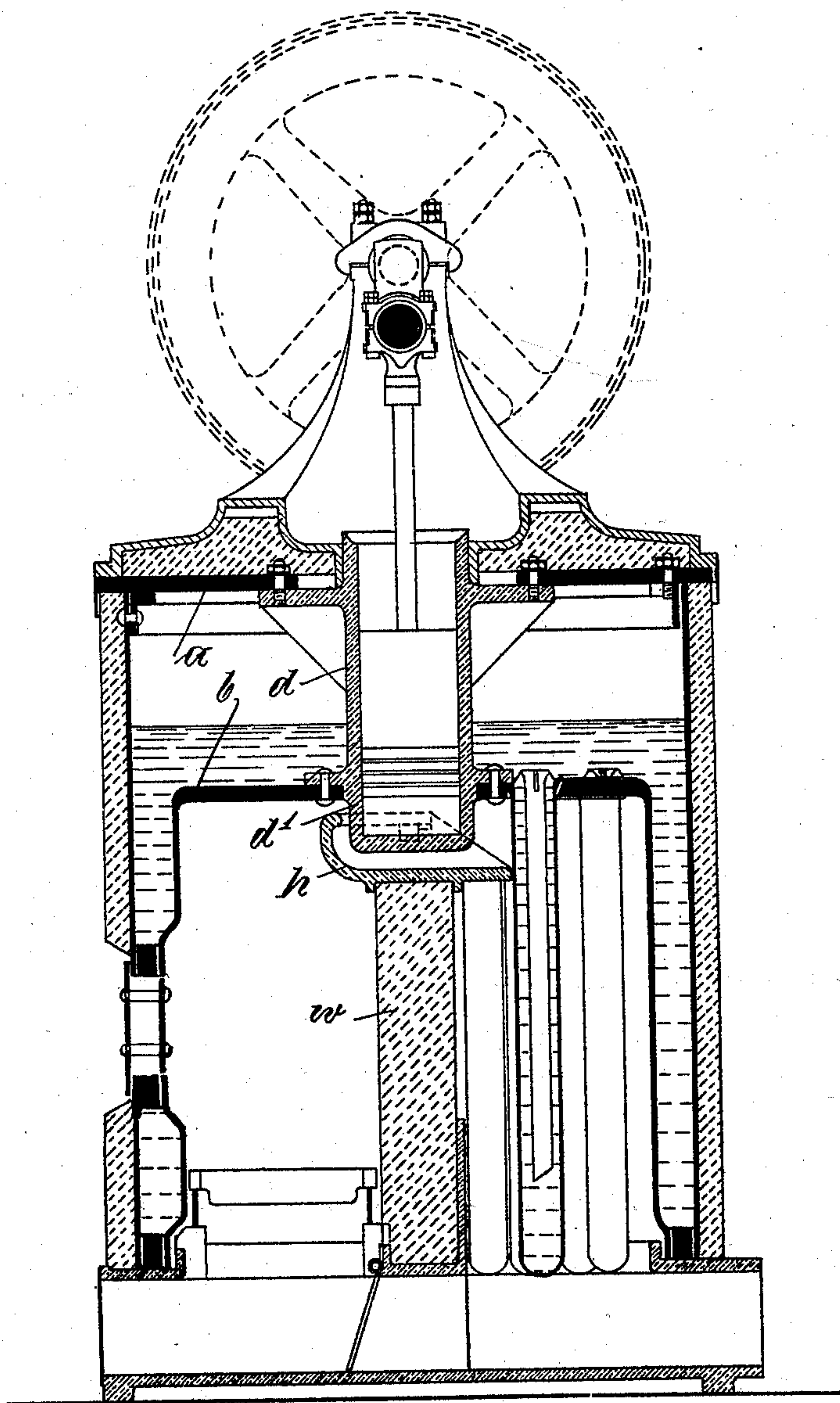
W. SCHMIDT.

COMBINED STEAM ENGINE AND STEAM GENERATOR.

No. 585,705.

Patented July 6, 1897.

Fig. 1.



Witnesses:
Emil Kayser
Paul Wollenberg.

Inventor
Wilhelm Schmidt
by
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Attorney

(No Model.)

2 Sheets—Sheet 2.

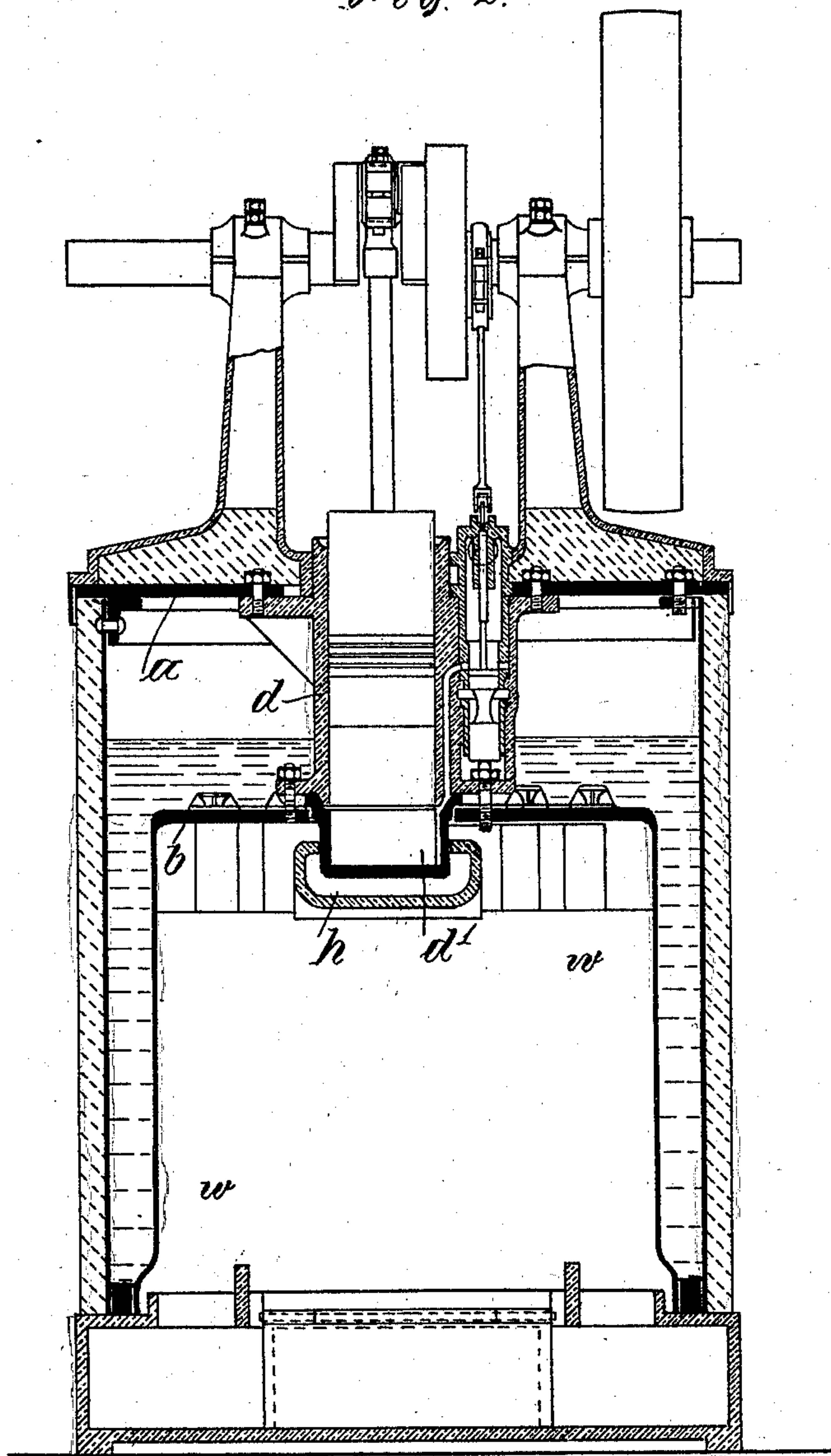
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Fig. 2.



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Paul Wollenberg.

Inventor
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by
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UNITED STATES PATENT OFFICE.

WILHELM SCHMIDT, OF BALLENSTÄDT, GERMANY.

COMBINED STEAM-ENGINE AND STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 585,705, dated July 6, 1897.

Application filed March 20, 1896. Serial No. 584,069. (No model.)

To all whom it may concern:

Be it known that I, WILHELM SCHMIDT, a subject of the King of Prussia, German Emperor, and a resident of Ballenstädt-on-the-Harz, in the Duchy of Anhalt, and of Aschersleben, German Empire, have invented a new and useful Combined Steam - Engine and Steam-Generator, of which the following is an exact specification.

This invention refers in general to steam boilers and motors in which both these parts are continuously rigidly united and in particular to such combined steam boilers and motors in which the cylinder of the latter is either partly or wholly arranged within the boiler. There are combined steam boilers and motors in which the cylinder is arranged within the steam-space of the boiler, and there are other combined steam boilers and motors in which the cylinder is arranged within the way of the fire-gases streaming forth from the furnace of the boiler. Neither of these arrangements has up to now met with the desired success, in that in the first case a strong condensation of steam within the cylinder and consequently a great loss of power could not be avoided, and in the second arrangement (which was devised in order to do away with the drawback just mentioned) the cylinder could not be protected against too strong a heating.

The purpose of my invention therefore is to overcome said last-named drawback too, and, moreover, to produce a combined steam boiler and motor that, first, is able to yield a very high useful effect; second, requires repairs either not at all or but in very long intervals; third, need not continually be attended to, and, fourth, may be manufactured at a comparatively very low price. I attain all these objects, first, by arranging the cylinder of the motor within the interior of the boiler in such a manner that it extends through the boiler-water and reaches with one end into the way of the fire-gases streaming forth from the furnace of the boiler; second, by employing the cylinder as a stay for the boiler, in that I connect an outer wall of the boiler proper with the fire-box; third, by dividing the latter into a furnace proper and another chamber by means of a fire-bridge that is arranged in the neighborhood of the

inner end of the cylinder and carries a hood that protects said end against too strong an action of the hot gases escaping from said furnace; fourth, by arranging tubes of the Field type within said other chamber, and, fifth, by making said inner end of the cylinder exchangeable, as is all more fully described hereinafter.

In order to make my invention more clear, I refer to the accompanying drawings, in which similar letters refer to similar parts throughout both views, and in which—

Figure 1 is a vertical section through my improved combined steam boiler and motor, and Fig. 2 is another vertical section taken at right angles to the former one.

In the form of construction shown the cylinder d is arranged in a vertical position within the interior of the boiler proper and connects the crown a of the latter with the crown b of the fire-box. The lower end d' of the cylinder projects through said crown b and extends into the way of the fire-gases that stream forth from the furnace. A fire-bridge w is arranged below the cylinder d and divides the fire-bridge into two chambers, one of which forms the furnace proper, whereas the other contains a number of tubes of the well-known Field type. The fire-bridge w carries a hood h , that takes around the portion d' of the cylinder and protects that portion against too strong an action of the fire-gases, as has already been mentioned in the preamble. The hot gases escaping from the furnace and passing over the fire-bridge w into the other chamber of the fire-box flow then downward along the Field tubes above mentioned and escape at the lower ends of said tubes, so that these ends are washed by comparatively cold gases and are thus fully prevented against being burned.

Although by the arrangement of the hood h the projecting lower end d' of the cylinder is well protected against too strong an action of the fire-gases, it may yet be that after a longer period of time said end requires a renewal. To facilitate this, I prefer to make the said end exchangeable, as shown in Fig. 2, in which the piece d' is inserted between the cylinder d proper and the crown b of the fire-box as a separate piece.

In consequence of the cylinder being ar-

ranged in the manner described it is constantly washed by the hot water contained within the boiler, and the portion d' that is exposed to the action of the fire-gases is thus very effectively cooled, while, on the other hand, the upper portion of the cylinder can cool down only to the highest temperature of the steam. The steam entering the portion d' of the cylinder is instantaneously and perfectly dried therein, and any excessive condensation of steam within the cylinder proper is fully prevented.

For the sake of completeness I now explain with regard to the distribution of the steam that the latter enters the valve-chest through a pipe c and flows from said pipe into an angular space e , provided within the valve-chest. The piston-valve f is in its middle portion contracted, and the space thus formed serves for intermittently connecting the angular space e aforementioned with the inlet-channel g for the cylinder. The piston-valve f is actuated from an eccentric i , that is arranged upon the main shaft k of the engine.

Having thus fully described the nature of this invention, what I desire to secure by Letters Patent of the United States is—

1. In a steam-boiler with motor, the combination with one of the walls between the water-space of said boiler, and the heating-space of the same, of the cylinder of said motor; said cylinder being arranged rectangularly to said wall and extending with an end portion through the said wall into said heating-space; the end of the remaining portion of the cylinder being connected with the boiler-wall that lies opposite to the wall first mentioned, for the purpose as described.

2. In a steam-boiler with motor, the combination with one of the walls between the water-space of said boiler and the heating-space of the same, of the cylinder of said motor;

said cylinder being arranged rectangularly to said wall, and extending with one end portion through the said wall into said heating-space; said end portion of the cylinder being exchangeable, for the purpose as described.

3. In a steam-boiler with motor, the combination with one of the walls between the water-space of said boiler and the heating-space of the same, of the cylinder of said motor; said cylinder being arranged rectangularly to said wall and extending with a portion through the same into said heating-space; a fire-bridge arranged below the said cylinder, and dividing said heating-space into two chambers, and a hood arranged upon said fire-bridge, and adapted to protect said portion of the cylinder against the direct action of the fire, for the purpose as described.

4. In a steam-boiler with motor, the combination with one of the walls between the water-space of said boiler and the heating-space of the same, of the cylinder of said motor; said cylinder being arranged rectangularly to said wall and extending with one end portion through the same into said heating-space, and a fire-bridge arranged below the said cylinder, and dividing said heating-space into two chambers; and a hood h located upon said fire-bridge and taking around the projecting end portion of the cylinder, one of said chambers forming the furnace proper, the other containing tubes of the Field type, for the purpose as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILHELM SCHMIDT.

Witnesses:

FRITZ SPERLING,
 W. HAUPT.