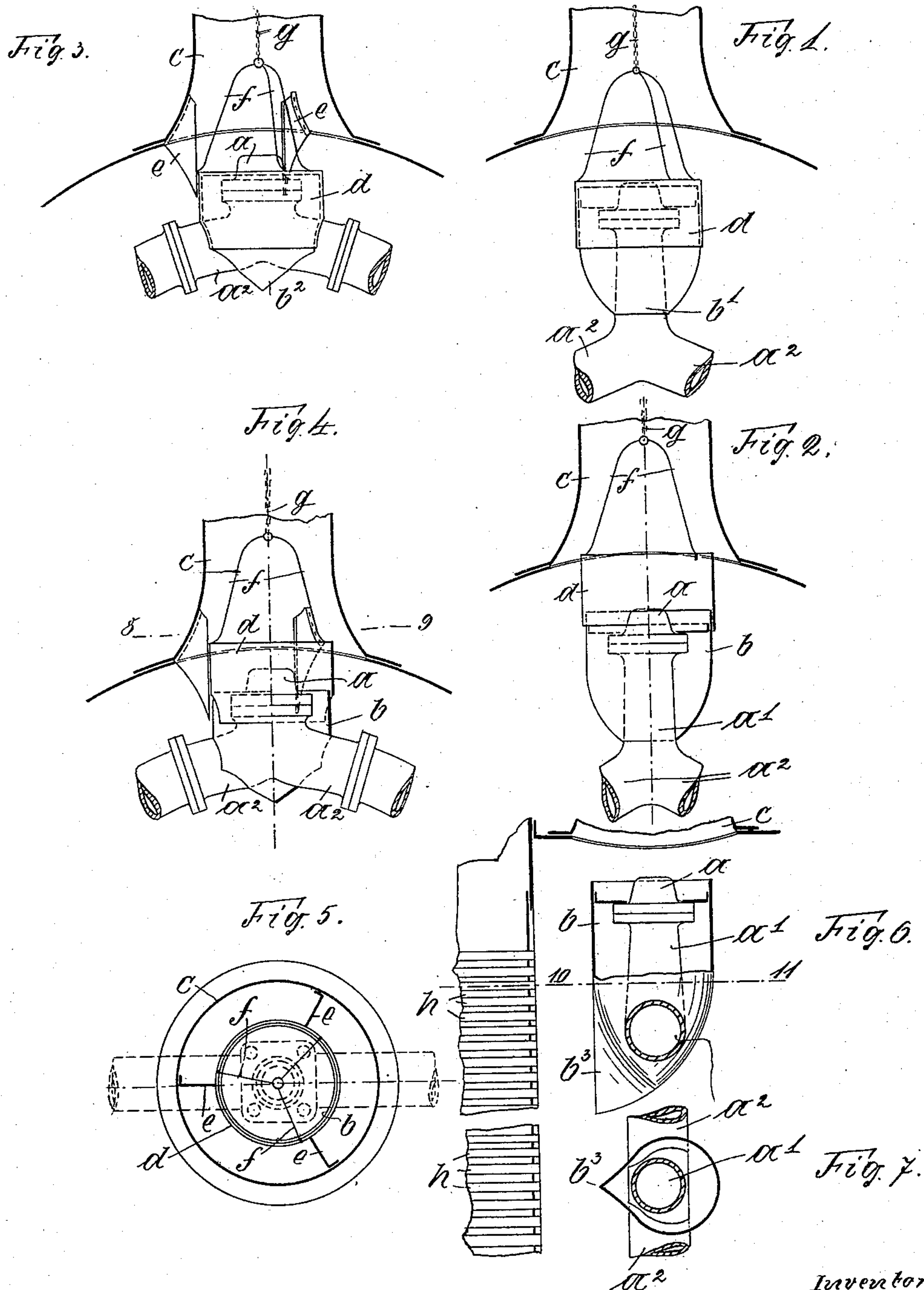


(No Model.)

R. DEISSLER.
COMBINED SPARK ARRESTER AND DRAFT REGULATOR.

No. 570,984.

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Witnesses:
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UNITED STATES PATENT OFFICE.

ROBERT DEISSLER, OF TREPTOW, GERMANY.

COMBINED SPARK-ARRESTER AND DRAFT-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 570,984, dated November 10, 1896.

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To all whom it may concern:

Be it known that I, ROBERT DEISSLER, a subject of the King of Prussia, German Emperor, and a resident of Treptow, near Berlin, in the Kingdom of Prussia, German Empire, have invented a Combined Spark-Arrester and Draft-Regulator for Locomotive-Engines, of which the following is an exact specification.

10 The draft requisite for maintaining the fire in the fire-box of a locomotive-engine is, as is known, produced especially by the waste steam exhausted by the nozzle into the chimney. The force of the draft thus produced depends on the quantity of said waste steam, and is therefore very great if the quantity of the waste steam is very great, or, in other words, if the cylinders are charged with great quantities of live steam at each stroke of their respective pistons. In such a case the draft is very often so strong as to tear particles of coal off the grate and to carry them in a burning or unburned, *i. e.*, in a non-exhausted, state through the fire-tubes into the smoke-box, and from thence through the chimney into the atmosphere. The particles of coal thus carried away represent a true loss of coal, and are moreover a real danger to the woods and forests which the engine is traveling through. In order to do away with the said drawback, I propose to combine the blast-nozzle with a fixed body which is arranged in such a manner that an annular space is left between its rim or edge and the chimney. I prefer to let said fixed body cooperate with a vertical slide that is adapted to narrow or close the annular space aforementioned. The fixed body forms a deflector for the rising fire-gases, *i. e.*, hinders the same from flowing upward in a true vertical direction. The fire-gases are, so to say, caused to make a byway on their way from the smoke-box to the chimney, and in doing so they push against the lower portion of the chimney, which latter is widened at its lower end or is contracted above said end, respectively. The particles of coal carried forth by the fire-gases are thus also caused to push against the lower portion of the wall of the chimney, from whence they fall down into the smoke-stack.

50

When the cylinders are charged with the

normal low quantities of live steam, (two-tenths or three-tenths,) the draft produced by the resulting waste steam is not so great as to be able to tear great particles of coal away from the grate, and the few sparks then carried forth by the gases are retained by the chimney, as just described. If, however, greater charges of live steam than the normal ones are necessary, and if, therefore, the draft would become stronger than required, the annular space between the fixed body and the chimney is correspondingly diminished by raising the vertical slide according to the quantities of the live steam with which the cylinders are charged at each stroke of their respective pistons. By this means the draft is reduced to its normal state and the coal is again prevented from being torn away from the grate, whereas the few sparks that may still escape from the fire-box are deflected by the fixed body, so that they push against the wall of the chimney and fall down into the smoke-box, as already stated.

I prefer to let the fixed body surrounding the nozzle be reduced toward its lower end; and if the exhaust-pipes leading the waste steam from the cylinders to the blast-nozzle are situated in close proximity to said nozzle I prefer to let the fixed body in question take not only around the nozzle, but around the adjacent portions of the exhaust-tubes, too, and in some cases I prefer, further, to arrange the fixed body at such a height that its upper edge is situated either in the plane of the opening of the nozzle or below said plane; but I wish it to be understood that I do not strictly confine myself to this arrangement, as this is greatly dependent on the distance between the opening of the nozzle and the lower end of the chimney and on the particular configuration of the lower portion of the latter.

The vertical slide requires, as a matter of course, a guide. The latter is preferably formed by the upper portion of the fixed body in question, but I may employ, instead of said body or together with the said body, a special guide or guide-pieces that may be arranged in a variety of ways, just as best suited for the particular type of locomotive-engine to which my novel device is attached.

In order to make my invention more clear, I

refer to the accompanying drawings, in which similar letters denote similar parts throughout the different views, and in which—

Figure 1 is a front view of my novel combined spark-arrester and draft-regulator, the slide being in its lowest position and the chimney being in section. Fig. 2 shows the same parts, the slide being, however, shown in a higher position. Fig. 3 is a front view of a slightly-modified form of construction in which the fixed casing takes not only around the nozzle, but around the adjacent portions of the exhaust-tubes, too. Fig. 4 shows the same parts, the slide being, however, raised. Fig. 5 is a horizontal section of the form of construction shown in Figs. 3 and 4, the section being taken on line 8 9 of said figures. Fig. 6 is a side view of a second modification, showing also a part of the smoke-box and of the adjacent portions of the fire-tubes, in this figure the vertical slide being left away; and Fig. 7 is a horizontal section taken on line 10 11 of Fig. 6.

Referring to Figs. 1 and 2, a designates the nozzle, and b the fixed body surrounding the same. In the form of construction shown in said figures the body b is reduced toward its lower end b' and terminates at each side of the exhaust-pipe a' into a sort of point or edge. The fire-gases escaping from the numerous small fire-tubes and rising up to the chimney c are thus deflected from their straight course, and are caused, first, to pass around the body b , and, second, to push upon the lower portion of the chimney c . The particles of coal carried upward by said gases are not deflected by the curved lower portion of the chimney, so as to pass up into this latter, but, owing to their greater weight, they push directly upon the mantle of the chimney and fall from the same down into the smoke-stack.

If now greater quantities of live steam are requisite for moving the locomotive-engine, (which, for instance, is necessary on starting the latter or if the train is to be moved upon an ascent,) then the vertical slide d , surrounding the upper portion of the fixed body, is raised in a corresponding degree, so as to diminish the annular space existing between the upper edge of said body and the lower end of the chimney c . The body b' may be regarded as a part of the body b . The latter may thus be elongated in an upward direction without, however, interfering in the least with the proper exhaust of the waste steam. The fire-gases, however, are more or less throttled according to the lower or higher position of the slide d , and the draft exerted upon said gases by the waste steam may in any case be regulated in such a manner that the coal is prevented from being torn off the grate, and the coal may thus be properly burned and exhausted. The few sparks that still may arise are in any case deflected by the reduced lower portion b' of the fixed body b , as are also the fire-gases or at least a cer-

tain portion thereof, and said sparks or the small particles of coal forming them, respectively, are then arrested by the chimney, as has before been fully described. I wish, however, to call special attention to the fact that not only the lower portion of the chimney serves as a spark-arrester, but also the slide d , provided said slide be raised to a certain height.

In the modified form of construction shown in Figs. 3, 4, and 5 the upper ends of the exhaust-pipes a^2 are situated in close proximity to the nozzle a , and the fixed body b surrounds, therefore, not only the nozzle, but takes also around the adjacent portions of said tubes a^2 . The body b is in this form of construction provided with a conical bottom b^2 , that deflects the fire-gases in exactly the same way as has been described with regard to Figs. 1 and 2.

The fixed body b does not form the only guide for the slide d , but special guide-frames e are secured to the lower portion of the chimney c . These guides e may well be replaced by a guide or guides of another description—for instance, by vertical rods secured to the upper rim of the body b . In this form of construction, as well as in that first described, the slide d is furnished with a three-armed bow f , attached to the lower end of a chain g . Said parts f and g serve for operating the slide from above, (through the chimney.) I wish it, however, to be understood that I do not confine myself to said means, as it will be clear to every expert that the slide may be operated by a variety of means.

The manner of action of the form of construction shown in Figs. 3 to 5 is exactly the same as aforesaid, but I call special attention to the fact that the conical bottom b^2 may well be replaced by a bottom of another configuration, provided said bottom be reduced toward its lower end or be shaped in such a manner that the fire-gases may be deflected by the same.

If the lower edge of the fixed body b terminate into an edge, this latter need not indispensably extend in a horizontal direction, but may as well be either more or less inclined or perfectly vertical, as shown as an example in the modification represented in Figs. 6 and 7. The upper portion of the body b is also in this form of construction circular or cylindrical, but is reduced toward its lower end in such a manner that the portion situated directly opposite to the flame-tubes h of the boiler is formed into a true vertical edge b^3 . In fact the configuration of the fixed body b , especially of the lower portion thereof, may widely vary, and I do not confine myself to any of the forms shown in the drawings. Said forms are to be regarded as mere examples; but in any case I do not claim such a deflecting-body *per se*, but always in combination with the vertically-movable slide.

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

1. In a locomotive-engine, the combination
5 with the chimney, and the blast-nozzle, of a fixed body surrounding said nozzle, and arranged so as to leave an annular space between itself and said chimney; said body being adapted to deflect the fire-gases to said
10 space; and a vertical slide encompassing the said body, and adapted to narrow the said space, for the purpose as described.

2. In a locomotive-engine, the combination with the chimney, and the blast-nozzle, of a
15 fixed body surrounding said nozzle, and having a diameter at least equal to that of the narrowest horizontal section of said chimney; said body being arranged so as to leave an annular space between itself and the said
20 chimney, and being adapted to deflect the fire-gases to said space; and a vertical slide encompassing the said body, and adapted to narrow the said space, for the purpose as described.

3. In a locomotive-engine, the combination with the chimney, and the blast-nozzle, of a
25 fixed body surrounding said nozzle, and arranged so as to leave an annular space between itself and said chimney; said body being reduced toward its lower end; and adapted to deflect the fire-gases to said space; and a
30 vertical slide encompassing the said body, and adapted to narrow the said space, for the purpose as described.

4. In a locomotive-engine, the combination with the chimney, and the blast-nozzle, of a
35 fixed body surrounding said nozzle, and arranged so as to leave an annular space between itself and said chimney; said body having a deepened bottom terminating into an edge or point, and being adapted to deflect the fire-gases to said space; and a vertical
40 slide encompassing the said body, and adapted to narrow the said space, for the purpose as described.

5. In a locomotive-engine, the combination

with the chimney, and the blast-nozzle, of a fixed body surrounding said nozzle, and arranged so as to leave an annular space between itself and said chimney; said body having its upper end situated in or below the
50 plane of the opening of the said nozzle, and being adapted to deflect with its lower end the fire-gases to said space; and a vertical slide encompassing the said body, and adapted
55 to narrow the said space, for the purpose as described.

6. In a locomotive-engine, the combination with the chimney, the blast-nozzle, and the exhaust-pipes, of a fixed body surrounding
60 said nozzle as well as the adjacent portions of said exhaust-pipes, and arranged so as to leave an annular space between itself and said chimney; said body being adapted to deflect the fire-gases to said space; and a ver-
65 tical slide encompassing the said body, and adapted to narrow the said space, for the purpose as described.

7. In a locomotive-engine, the combination with the chimney, the blast-nozzle, and the
70 exhaust-pipes, of a fixed body surrounding said nozzle as well as the adjacent portions of said exhaust-pipes, and having a diameter at least equal to that of the narrowest horizontal section of said chimney; said body being
75 arranged so as to leave an annular space between itself and the said chimney, and having its upper end situated in or below the plane of the opening of the said nozzle, and having its lower end reduced so as to deflect
80 the fire-gases to said space; and a vertical slide encompassing the said body, and adapted to narrow the said space, for the purpose as described.

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

ROBERT DEISSLER.

Witnesses:

W. HAUPT,
HENRY HASPER.