

No. 614,586.

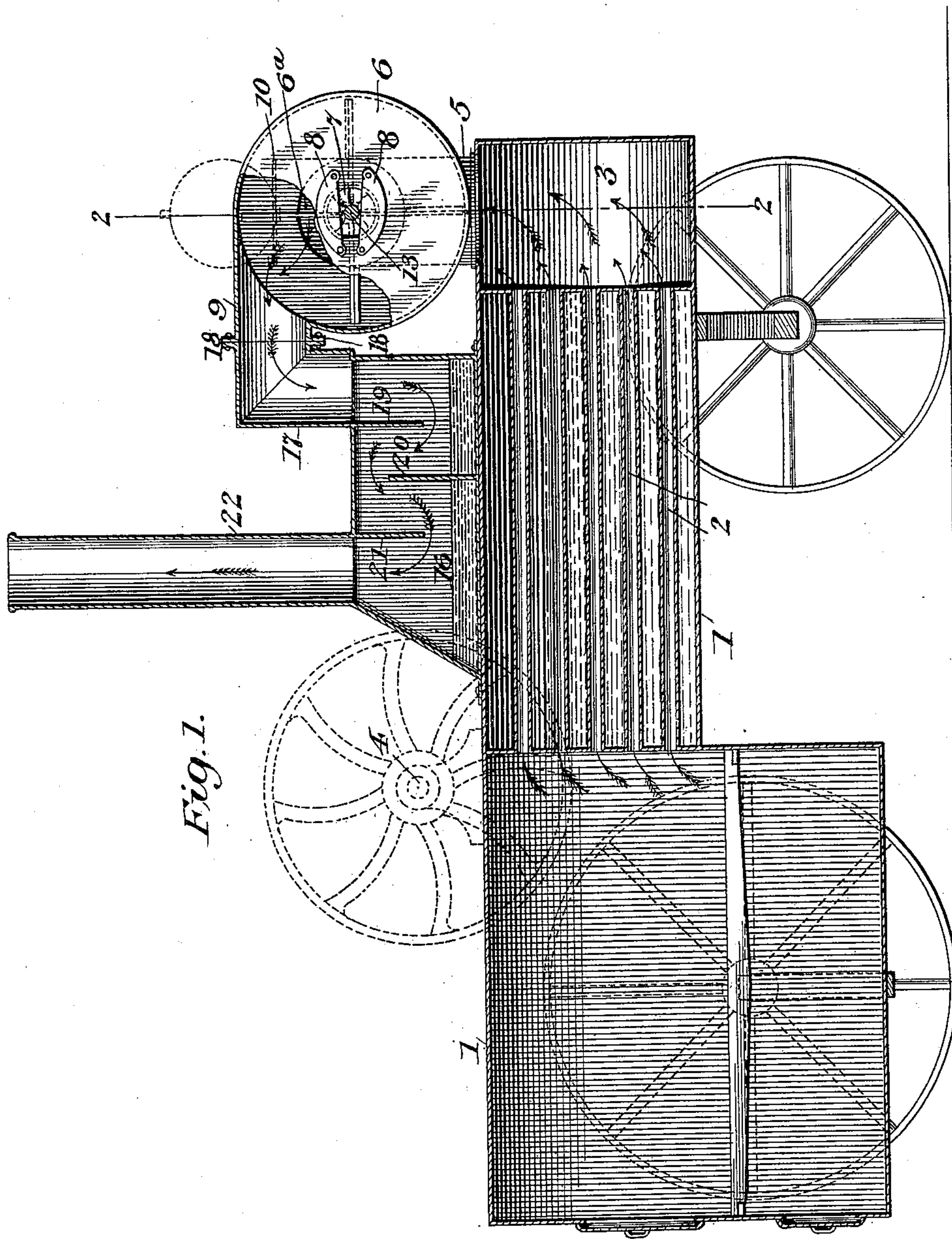
Patented Nov. 22, 1898.

T. THORSON.  
SPARK ARRESTER.

(Application filed May 11, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

*J. A. Digger*  
*H. J. Bunker*

Thomas Thorson Inventor

By *his* Attorneys,

*C. A. Snow & Co.*

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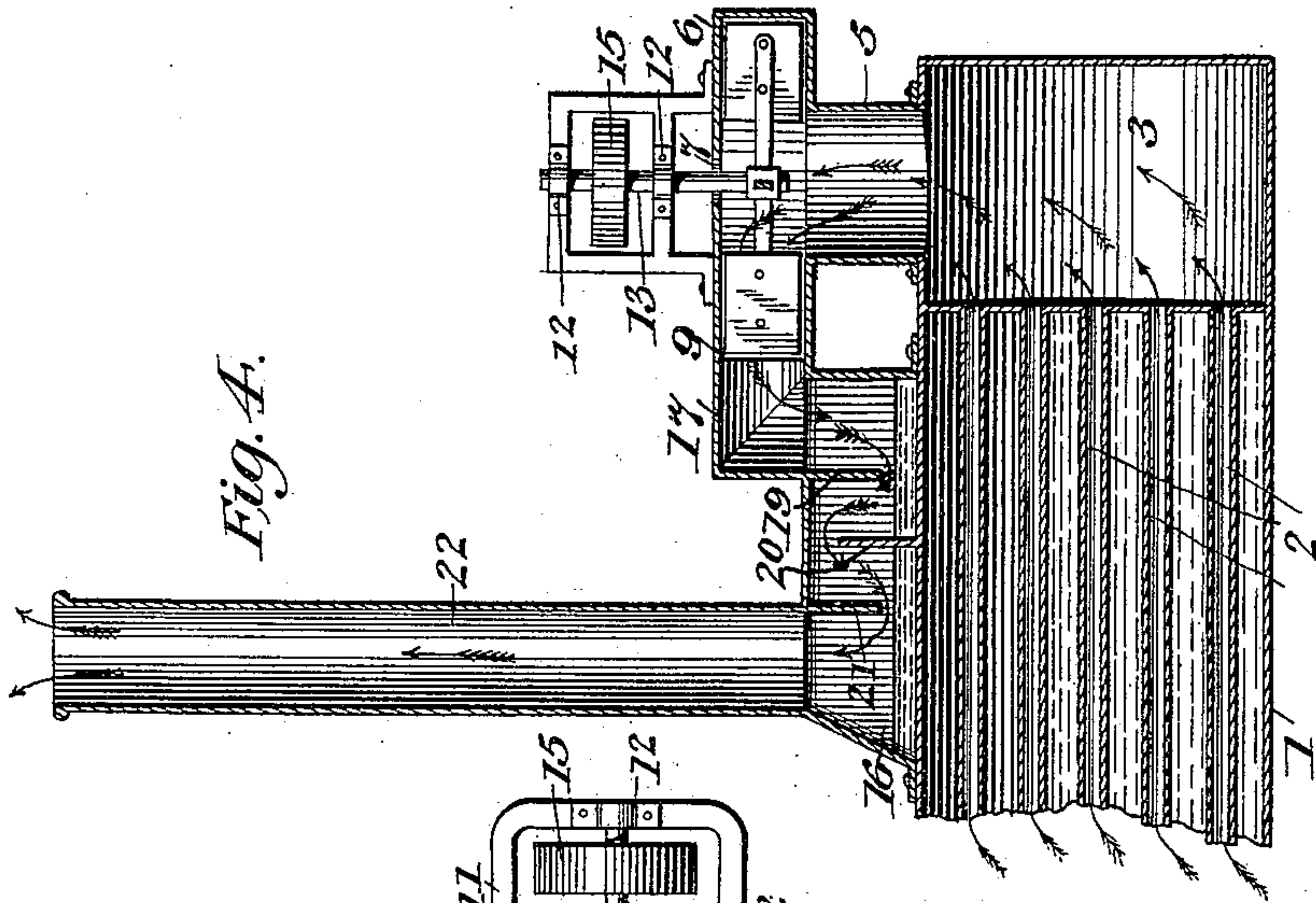
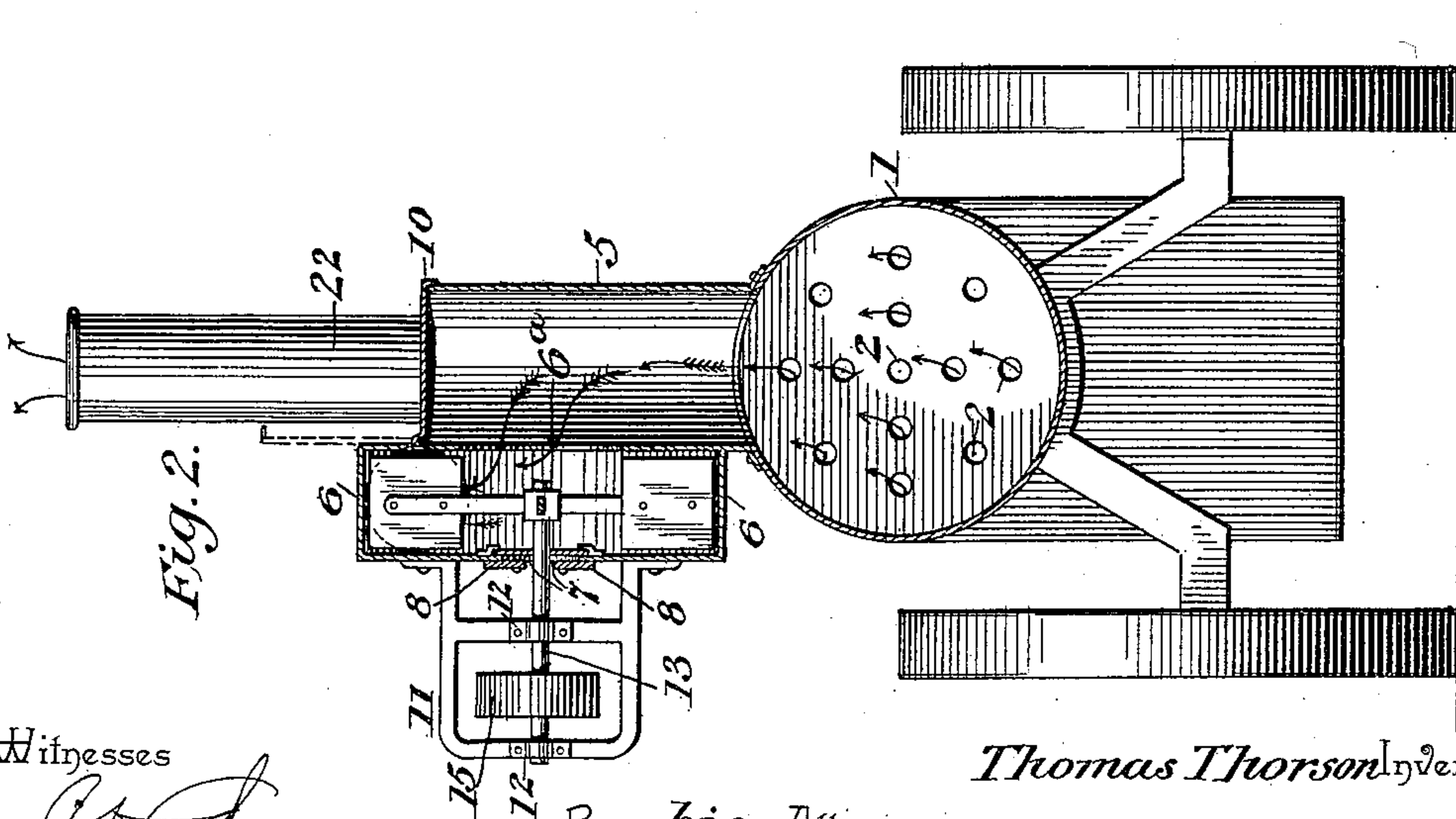
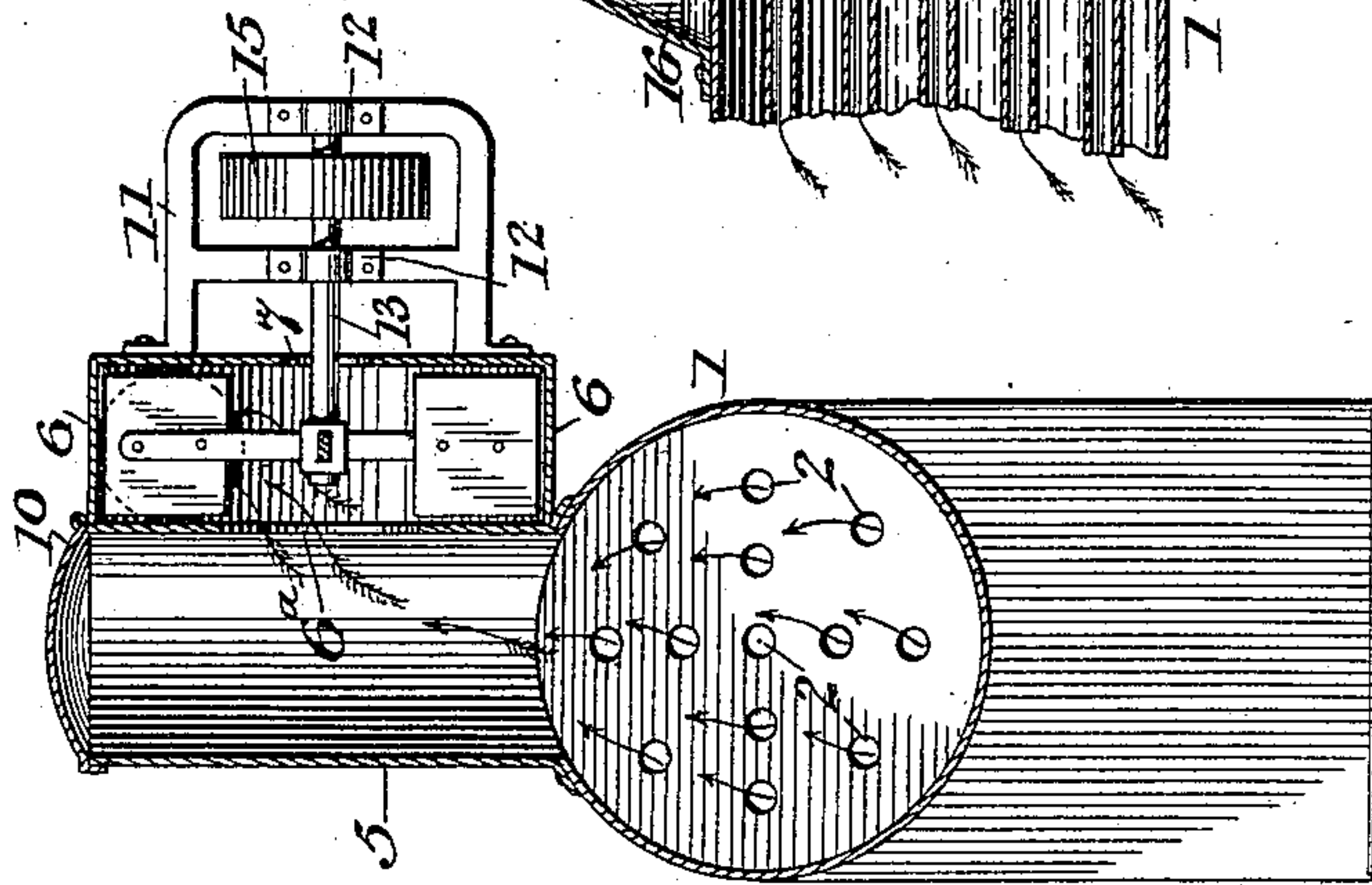


Fig. 3.



Witnesses

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By his Attorneys,

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# UNITED STATES PATENT OFFICE.

THOMAS THORSON, OF BROWNTOWN, WISCONSIN.

## SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 614,586, dated November 22, 1898.

Application filed May 11, 1898. Serial No. 680,372. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS THORSON, a citizen of the United States, residing at Browntown, in the county of Green and State of Wisconsin, have invented a new and useful Spark-Arrester, of which the following is a specification.

My invention relates to improvements in spark-arresters designed for use on steam-boiler furnaces generally, although it is more particularly adapted for use in connection with traction-engines; and the object that I have in view is to provide a structure which will effectually extinguish the sparks, collect the cinders, and at the same time provide the necessary draft to the furnace-flues and smoke-box to maintain combustion of the fuel in the grate-chamber.

A further object of the invention is to provide a spark-arrester which may be readily cleansed of the cinders that accumulate therein, and, furthermore, I aim to simplify the construction, provide for its ready application to a threshing-engine, and promote the efficiency in the operation of the structure.

With these ends in view the invention consists in the novel combination of elements and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others to understand the invention, I have illustrated different embodiments thereof in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a vertical sectional elevation through a traction-engine with my improved spark-arrester applied thereto. Fig. 2 is a vertical transverse section through a part of the improvement and the smoke-box of the portable engine, the plane of the section being indicated by the dotted line 2 2 of Fig. 1. Fig. 3 is a vertical cross-section somewhat similar to Fig. 2, but illustrating a slightly-modified arrangement of the spark-arresting appliances on the portable engine. Fig. 4 is a vertical sectional elevation of another modified embodiment of the spark-arresting appliance in which the suction-fan is arranged for rotation in a horizontal plane and on a vertical axis.

Like numerals of reference denote like and

corresponding parts in each of the several figures of the drawings.

In order that others skilled in the art may understand the nature of my improved spark-arrester, I have illustrated the same applied to a portable engine in the several figures of the drawings; but it will be understood that no novelty for the engine *per se* is herein claimed and that I do not confine myself to the employment of the spark-arrester in this particular type of engines, because I reserve the right to apply the arrester to any style of steam-boiler furnace to prevent the escape of sparks therefrom.

The numeral 1 designates the boiler of a threshing-engine. 2 are the smoke-flues therein. 3 is the smoke-box, and 4 is an engine-shaft.

Erected vertically on the forward end of the engine-boiler is a short vertical smoke-stack 5, which is suitably united to the boiler-shell and which communicates directly with the smoke-box 3 therein. The upper end of this smoke-stack is designed to be closed by a suitable cover or head 10 when the engine-boiler is in service and the suction-fan of the spark-arrester is positively driven; but this cover or head 10 is removably secured in place to the upper end of said short smoke-stack 5 for the purpose of permitting the escape of the smoke and products of combustion from the boiler when the fire is started therein or when the fan of the spark-arrester is at rest.

6 designates a fan drum or casing which is suitably attached either to the short smoke-stack or the boiler-shell in any suitable way, and this fan-casing communicates with the short smoke-stack 5 at a point intermediate of the height of the latter through an opening or port 6<sup>a</sup>, located centrally with respect to the casing or drum, so that the products of combustion may be drawn when the fan is in motion from the smoke-stack 5 into the drum or casing 6. In the opposite head of the fan-drum to the port 6<sup>a</sup>, which establishes communication between said drum and the smoke-stack 5, there is provided an air-inlet port 7, which is normally closed by means of regulating slides or doors 8, suitably supported on the outer side of the fan-drum, so as to be within convenient reach of the engine-attend-



ant. These regulating slides or doors may be fitted to the fan-drum to slide thereon across the opening 7, or said doors 8 may be hinged or pivoted to the fan-drum to be adjusted across the air-opening 7. Under normal conditions the slides or doors 8 remain closed and the fan is adapted to create the draft through the furnace and exhaust the products of combustion from the smoke box and stack to the fan-drum; but to regulate the draft through the furnace the slides or doors 8 may be opened more or less to admit atmospheric air to the fan-drum at the eye of the rotary fan therein. The admission of atmospheric air to the fan at the axial line of its drum or casing decreases the draft through the furnace by reducing the strength of the suction or current created by the rotary action of the fan, and thus my appliance is made to serve as a draft-regulator for the engine-furnace as well as a spark-arrester to prevent the escape of live sparks from the furnace. This fan drum or casing 6 terminates in a discharge mouth or nozzle 9, which faces toward the rear end or grate-chamber of the engine, and from one side of the fan-drum extends a frame 11, which serves to support the shaft of the rotary fan. In Figs. 1 and 3 of the drawings this frame is shown as extending from the fan-drum on the opposite side to the short smoke-stack 5, and said frame may be of any suitable construction and attached to the fan-drum by any approved means. The frame is constructed with alined shaft-bearings 12, arranged in the plane of the axis of the fan-drum 6, and in these bearings is journaled the shaft 13 of the rotary fan 14. The inner end of this fan-shaft 13 extends through the air-inlet opening 7 of the fan-drum, so as to terminate within the drum, and to said end of the fan-shaft is rigidly secured the hub of the rotary fan, the latter being of any desired construction approved by those skilled in the art. The bearings 12 on the supporting-frame 11 are spaced apart a suitable distance for the fan-shaft 13 to receive the driving-pulley 15, around which passes an endless belt that is driven from a pulley on the engine-shaft 4 or from any other suitable shaft of the traction-engine.

16 designates a water-tank which is placed upon the boiler of the traction-engine, and this tank may simply rest upon the boiler or it may be removably secured thereto by bolts or clamps. The water-tank 16 is adjacent to the fan-drum 6 and preferably extends lengthwise of the engine-boiler, and at one end this water-tank is constructed with an elbow 17, that extends upwardly to the discharge nozzle or mouth 9 of the fan-drum. This elbow of the water-tank is operatively connected with the mouth of the fan-drum in a detachable manner for the purpose of permitting the water-tank to be uncoupled from the fan-drum, so as to enable the attendant to gain access to the interior of the water-tank and clean the cinders which accumulate

in said tank, and in the embodiment of the invention shown the connection of the water-tank to the fan-drum is effected by a union or coupling 18 of any preferred construction. The end of the water-tank distant from the connection of said tank to the fan-drum is closed, and to this closed end of the tank is attached a smoke-stack 22, which is somewhat longer than the smoke-stack 5.

Within the water-tank, between its communication with the fan-drum and the rear smoke-stack 22, is a series of baffles or deflectors arranged in zigzag order to give to the products of combustion a tortuous or sinuous course through the water-tank, whereby the live sparks conveyed by the escaping products of combustion are caused to impinge against the baffles and to be precipitated into the water, which is contained in the lower part of the tank to the level indicated by the line referred to on the drawings as the "water-line." A series of three baffles or deflectors is provided within the water-tank, and of these baffles the first one 19 is arranged adjacent to the elbow 17 and depends from the upper side of the water-tank to terminate on a line above the water-level in said tank. The second baffle 20 is fixed to the bottom of the water-tank at a suitable distance from the baffle 19, and it extends upwardly from the tank-bottom to terminate a suitable distance below the top of said tank, while the third baffle 21 is situated at a suitable distance from the second baffle 20 and adjacent to the long smoke-stack 22, said third baffle 21 depending from the top of the water-tank and terminating at its lower edge on the plane of the corresponding edge of the baffle 19 and at a suitable distance above the water-level. The baffles on the top and the bottom of the tank are thus disposed in alternate or zigzag relation to form a continuous smoke-passage through the water-drum which compels the escaping products of combustion to pursue a sinuous course through said water-tank. As the products of combustion traverse the smoke-space of the water-tank the sparks and cinders carried thereby impinge against the series of baffles, which arrests the progress of the sparks and cinders and insures their precipitation into the water contained in the lower part of the tank 16, and thus the sparks and cinders are extinguished and caused to accumulate in the water-chamber of the tank 16, from whence they may be removed at any time by disengaging the tank 16 upon proper adjustment of the union or coupling 18. In the embodiment represented by Fig. 3 of the drawings the fan drum or casing is disposed at one side of the vertical plane of the short smoke-stack 5, and the smoke-passage through this stack 5 is continuous or uninterrupted. The object in locating the fan-drum and the parts associated therewith is to position the drum away from the boiler of the portable engine and not expose the fan and the devices



associated therewith to the intense heat from the smoke-box.

The spark-arrester shown by Figs. 1 to 3, inclusive, contemplates the employment of a fan rotating in the vertical plane on a horizontal axis; but this is not strictly necessary, because the fan may be arranged to rotate in a horizontal plane and about a vertical axis, as shown by Fig. 4. In this embodiment of the invention the fan-drum is arranged in a horizontal position and the supporting-frame for the fan-shaft assumes a vertical position above the drum, which at its lower side communicates directly with the short stack or trunk which is in communication with the smoke-box of the boiler. The fan-drum is coupled with the elbow of the water-tank, which at its other end communicates with the smoke-stack, and between the fan-drum and the elongated smoke-stack are the series of baffles which intercept the sparks and cinders to deflect the same into the water contained within the tank.

In the operation of my spark-arrester the fan is driven positively by suitable power connections with the engine, on which the spark-arrester is installed, and said fan rotates in a direction to force the current into the nozzle or mouth of the drum. The rotation of the fan creates a suction through the furnace, and this suction may be regulated by adjusting the wind slides or doors. The exhausted products of combustion are forced by the fan through the tortuous smoke-space of the water-tank and they find their exit through the elongated smoke-stack.

I am aware that changes in the form and proportion of parts and in the details of construction may be made by a skilled mechanic without departing from the spirit or sacrificing the advantages of the invention, and I therefore reserve the right to make such modifications as clearly fall within the scope of the invention.

Having thus described the invention, what I claim is—

1. The combination with a smoke-stack in communication with a boiler-furnace, of a

fan-drum connected directly to said smoke-stack and provided with a valve-controlled inlet, a water-chamber communicating with the outlet of the fan-drum and provided with the baffles, and an elongated smoke-stack communicating with the smoke-space of said water-tank, substantially as described.

2. In a spark-arrester, the combination of a settling-tank provided with the alternately-arranged baffle-plates forming a tortuous circulating-flue and adapted to contain a liquid-bath in a plane below the pendent baffle-plates, a suction-fan connected with a boiler smoke-box and with the settling-tank at one side of the series of baffle-plates therein, and an outlet-pipe also connected with the settling-tank on the opposite side of the plates therein, substantially as described.

3. The combination with a boiler having the smoke-stack leading from the smoke-box thereof, of a settling-tank mounted in said boiler and having the baffles arranged to produce a tortuous circulating-flue therein, a fan-casing communicating directly with the smoke-stack and coupled to the settling-tank at one side of the baffles therein, a rotatable fan within said fan-casing, and an outlet-pipe coupled to the smoke-box at the opposite end from the fan-casing, substantially as described.

4. The combination with a boiler, of the short smoke-stack connected with a smoke-box of said boiler, a fan-casing having its inlet united laterally to the smoke-stack to communicate directly therewith, a rotatable fan within said casing, a settling-tank seated on the boiler and coupled detachably to the outlet of the fan-casing and provided with the baffles arranged to form a tortuous circulating-flue, and an outlet-pipe connected with said tank, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

THOMAS THORSON.

Witnesses:

DWIGHT WOOD,  
J. T. SHAUGHNESSY.