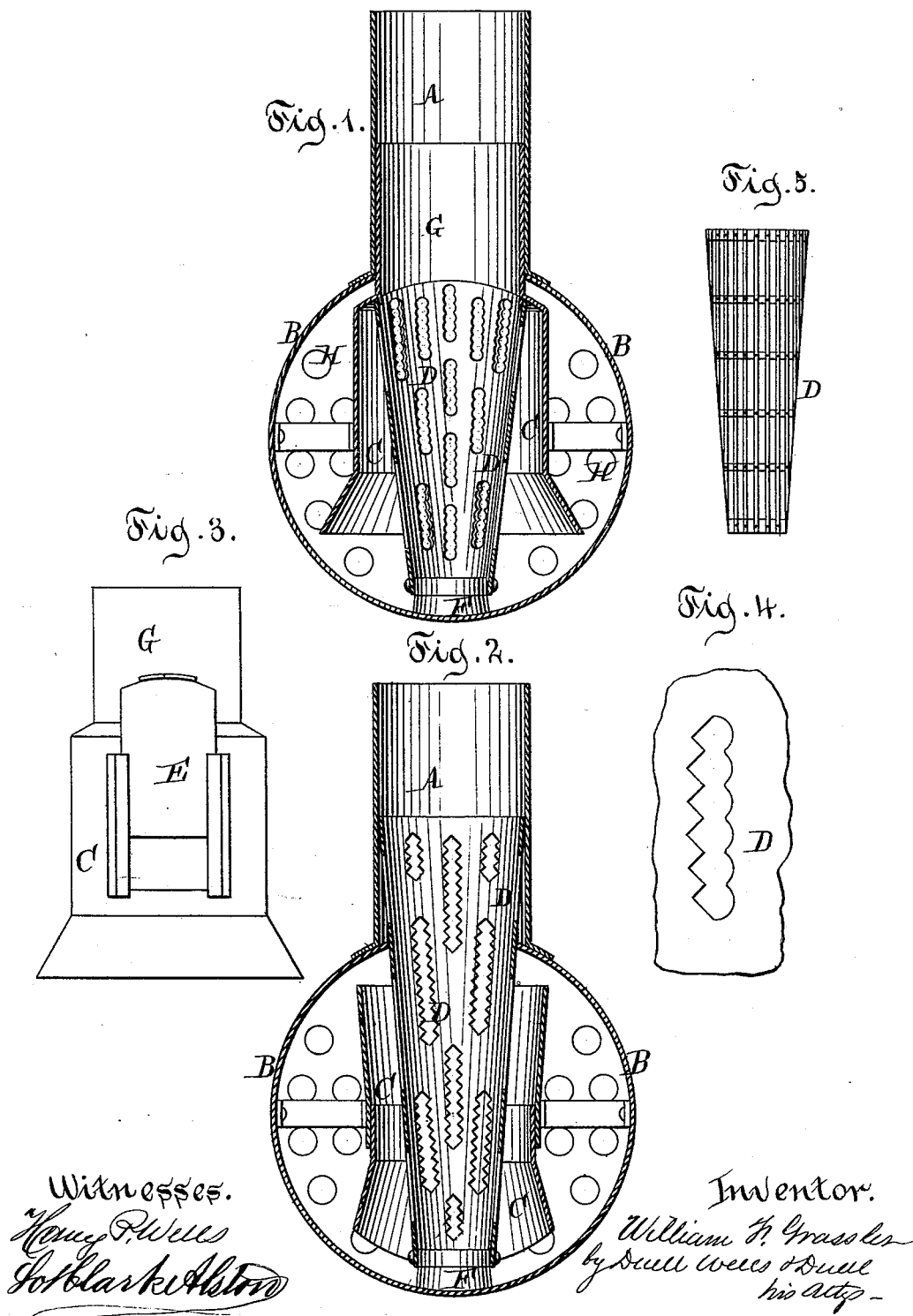


W. F. GRASSLER.
Spark-Arrester for Locomotives.

No. 218,258.

Patented Aug. 5, 1879.



UNITED STATES PATENT OFFICE.

WILLIAM F. GRASSLER, OF MUNCY, PENNSYLVANIA, ASSIGNOR OF THREE-EIGHTHS HIS RIGHT TO A. SWAN BROWN, OF NEW YORK, N. Y.

IMPROVEMENT IN SPARK-ARRESTERS FOR LOCOMOTIVES.

Specification forming part of Letters Patent No. **218,258**, dated August 5, 1879; application filed July 17, 1879.

To all whom it may concern:

Be it known that I, WILLIAM F. GRASSLER, of Muncy, in the county of Lycoming and State of Pennsylvania, have invented a new and useful Improvement in Spark-Arresters for Locomotives, of which the following is a specification, reference being had to the accompanying drawings.

From the first invention of the railway-locomotive, dust and cinders have been a great source of discomfort to railway-passengers, and a serious injury to the interior fittings of passenger-coaches. Furthermore, ignited sparks from engines have and do often give rise to disastrous conflagrations on the lines of such roads. Cinders and sparks are altogether, and dust is mainly, due to the blast of the exhaust-steam, which, escaping into the smoke box and stack under great pressure, creates a powerful current through the boiler-tubes, sucking up the smaller particles of fuel from the fire, and driving them through the tubes and out of the smoke-stack into the air. These fall upon the trains and adjacent country, and give rise to the dangers and annoyances aforesaid. Many devices have been tried to overcome these. Usually the outer opening of the stack is covered with wire-gauze, protected on its under side by a smaller cast-iron plate to receive the first blow of the sparks; but in this method it is necessary to have the wire-gauze so coarse as to act very imperfectly, and, besides, the cast-iron plate impedes the freedom of the exhaust, and more or less back-pressure in the cylinders and imperfect combustion result.

Again, the exhaust has been discharged into a wire-gauze tube, or into a pipe with circular perforations, with the idea of straining, as it were, the products of combustion, and thus eliminating the larger particles; but this method has been found to produce more evil than good, for the holes or gauze soon become clogged and the draft impaired, and frequent stoppage and opening of the smoke-box and cleaning of the pipe become necessary to steam at all. These difficulties have led to the general disuse of the latter method and employment of the first, though it is admitted to be imperfect and objectionable.

My invention is intended to overcome these difficulties.

be built up of metal bars riveted or otherwise secured to rings, as shown in Fig. 5. Indeed, it makes no difference how or of what it is made, so long as it fills the following conditions: First, it should be quite rigid—*i. e.*, not yielding before the impact of the sparks and cinders; second, the apertures should be perpendicular, and as numerous and close together as possible, but not so numerous or close as to impair the rigidity aforesaid; third, under the same limitations, the apertures should be as long as possible, and narrow enough to exclude anything not very small—say, three-sixteenths of an inch wide.

If soft coal is the fuel, I surround the spark-arrester with any of the ordinary forms of lifting-pipe C, Fig. 2, placed and secured in the usual manner, but provided with a door on its front side, so as to make the nozzle and spark-arrester accessible without removing the lifting-pipe.

If hard coal is to be the fuel, a shorter spark-arrester—say, about two or three feet long—will answer, and, being cheaper to make, is used. In that case I extend the smoke-stack within the smoke-box, as shown in Fig. 1, or at G, Fig. 3, and connect the lifting-pipe C closely to this extension. I place a door, E, Fig. 3, in this lifting-pipe, to render the nozzles and spark-arrester accessible without disturbing the lifting-pipe, as in the soft-coal lifting-pipe.

The form of lifting-pipe that I have used is shown in Fig. 3; but any form will answer, provided its top is united to the extension of the smoke-stack within the smoke-box.

My device operates as follows: The exhaust is delivered into the spark-arrester, creating a partial vacuum in the smoke box, and the air consequently rushes through the grate-bars, fire, and tubes to supply its place. Borne on the current are the usual sparks and cinders. They strike within the smoke-box, fall, are seized by the current incited by the exhaust, and drawn between the lifting-pipe and the spark-arrester and dashed against its surface, and cut by the teeth or projections of the apertures until fine enough to pass through the same. When within the spark-arrester they are either cooled or are extinguished by

the exhaust-steam. At any rate, at night, when in operation, no ignited body has been seen to issue from the smoke-stack.

The use of the same engine with and without this device over the same route and under the like conditions has shown that the free exhaust for the steam relieves the cylinders of back-pressure—if not perfectly, at all events to a very great degree over the ordinary methods in use—and that the unimpeded flow of the products of combustion into the spark-arrester, and thence into the air, gives a much cleaner consumption of the fuel, its smoke, and gases in the fire