J. Du BOIS.

Spark-Arrester.

No. 165,662. Patented July 20, 1875.

Fig. 1.

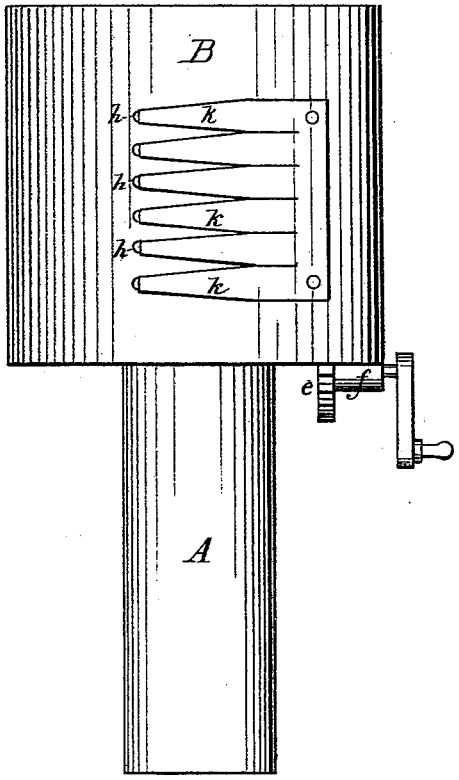


Fig. 2.

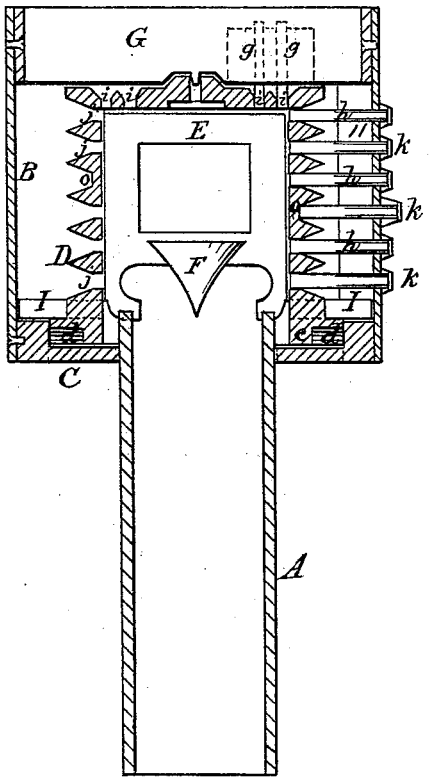


Fig. 3.

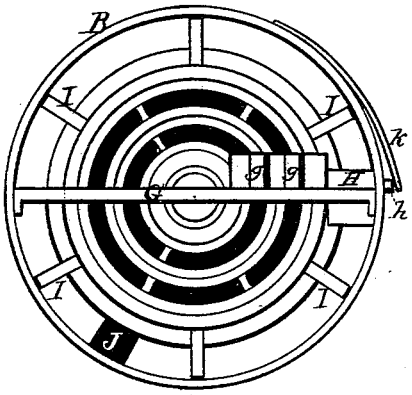
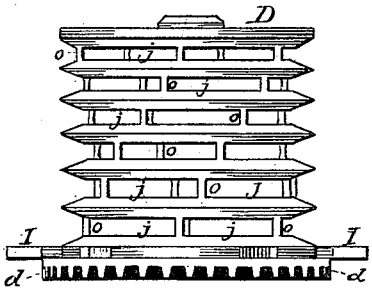


Fig. 4.



WITNESSES

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IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **165,662**, dated July 20, 1875; application filed June 16, 1875.

To all whom it may concern:

Be it known that I, JOHN DU BOIS, of Williamsport, in the county of Lycoming and State of Pennsylvania, have invented a certain new and useful Improvement in Locomotive Spark-Arresters; and the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents an outside view of the upper portion of my improved spark-arrester and smoke-stack, showing the springs that operate the series of movable scrapers for cleaning the screen. Fig. 2 shows a vertical section through the smoke-stack and revolving spark-arrester. Fig. 3 is a top view of the smoke-stack, showing the revolving screen, and the series of movable scrapers for cleaning the screen, and the series of radiating arms or wipers, to discharge the soot and cinders. Fig. 4 shows the revolving screen, and arms for discharging, and gear for revolving it, detached from the stack.

The object of my invention is to effectually arrest the sparks and cinders caused by the great draft on the fire through the flues of locomotive steam-boilers produced by the exhaust steam in the smoke-stack from being carried beyond the top of the stack of sufficient size and heat as to set fire to the surrounding objects at any considerable distance from the track, and thereby greatly lessen the liability of setting on fire the forests through which numerous railroads are built, and also causing an immense amount of lumber, wood, and buildings to be consumed annually by sparks from passing locomotives; and it consists in a movable or revolving screen, having narrow apertures in both its sides and top, to admit the escape of the smoke and exhaust steam without suppressing the draft, the same being provided with a stationary scraper on the inside of the screen, and yielding scrapers, operating on the outside to clean the screen and its apertures from soot, by revolving or turning the screen in the case or outer cylinder which composes the top of the smoke-stack, the lower end of the screen being provided with a series of arms or scrapers to discharge the sparks and soot that collect both on the inside and outside of the screen, and wipe them out at the opening made in the bottom of the flange that supports the revolving screen for that purpose.

All of the locomotive spark-arresters that have come to my notice mainly rely upon a screen made of woven wire or perforated plates, secured in the enlarged portion, or at the top of the smoke-stack, to prevent the sparks and flaming cinders from being ejected by the great force of the exhaust steam into the lower portion of the stack to create the necessary draft, and the screen is only protected from being cut out by the impinging of the sparks and cinders against it by putting underneath it various kinds of deflectors, the only means of escape for the smoke and exhaust steam being through the screen or wire gauze, as also the draft.

In rainy and damp weather, the most or all of the screen being exposed from the top, and the condensation of a portion of the steam underneath, causes the soot and smaller particles of cinders to adhere to it, and thereby contracts or closes up the apertures, and obstructs the exhaust to such an extent as to destroy the draft, and disables them from making the necessary amount of steam to run the train successfully. There being no efficient means provided by which the engineer can clean the screens and open the draft necessary to run on time, the consequence is, the bar or other powerful instrument is resorted to, and the screen is torn away in order to give draft, and the sparks and the large flaming hot cinders pass through the opening thus made, and, in their descent, are often carried by the wind to a considerable distance—sufficiently far to set fire to buildings, lumber-yards, and wood-piles (to say nothing of forest fires) along the line of the roads, and are the cause of great loss in the destruction of property.

My invention differs from any that have come to my knowledge, in that I provide an immediate and efficient means by which the engineer can keep the screen clean and free from being choked up by soot or cinders in all weathers and under all circumstances, a description of which I will give more in detail, referring to the several figures of the drawings, and to the letters of reference thereon.

The form of the smoke-stack, as shown in Figs. 1 and 2, may be composed of the cylin-

drical pipe A, set and secured upon the boiler in the ordinary manner; but, in forming my spark-catcher B, I enlarge the top portion to at least three times or more the size of the stack A. The upper portion B is supported on a flange, C, secured to the stack A, on which is placed and secured centrally, by the recess *c* in the flange, the revolving screen D, on the under edge of which is a cog-gear wheel, *d*, provided with a pinion, *e*, on a horizontal shaft, *f*, which may extend from the stack back to the engineer's stand, to be operated by turning a crank. The portion of the stack A extends up into the bottom of the revolving screen D, and is provided with a stationary upright plate-scraper, E, that fits closely to both the top and sides of the inside of the screen D, so that when the screen is moved in revolving it scrapes and cleans effectually the inside of the same. To the lower bar of the plate-scraper E is secured an inverted cone, F, to deflect the sparks and cinders driven up by the force of the exhaust steam against the sides of the rotary screen D.

For the purpose of scraping and cleaning the top of the screen and keeping its apertures open I provide a scraper-bar, G, to which I attach a series of movable blades or bars, *g g*, fitting into the annular slots or openings *i i*, to effectually remove anything adhering to the screen, or the top portion of it. The rotating screen D has narrow slots or openings *j j*, running round parallel with each other, covering its entire surface, they being supported at irregular intervals by bars *o o*. The openings *j j* may be made quite narrow—say, one-eighth of an inch—so as to preclude sparks and cinders from passing through of a size sufficient to ignite anything, and yet leave an abundance of space through for the smoke and exhaust steam and the draft. The openings *j j* are kept open and clean by a series of movable blades or scrapers, *h h*, fitted to move in and out of the openings in grooves made in the bar H, secured to the inside of the spark-catcher B, and each one of the scrapers *h* extending through to the outside of the case, and are held in to operate by a series of springs, *k k*, secured on the outside. The bottom of the rotating screen D, where it rests upon the flange C, is provided with a series of radiating arms, I I, extending both in and outside of the screen, so as to scrape the cinders and sparks from both apartments into an opening or spout, to be discharged at any desired point or place by revolving the screen, cleaning them all out at each revolution. The inverted-cone deflector F, against which the sparks and cinders strike with much violence, and are thrown against the sides of the screen D, will be broken and reduced, so that they will be easily discharged at the opening J through the flange C, as well as the soot and smaller particles that pass through the openings in the screen to the space that surrounds it.

The sides of the upper portion of the stack B being vertical and parallel with the sides of the screen, and the unobstructed large opening at the top of the stack, the draft will not be in the least obstructed, and the force of the exhaust so much expanded within the case B that nothing but light sparks will be likely to be blown over the outside of the stack, thus making a safe, practical, and efficient locomotive spark-arrester, that can easily be kept from clogging up to stop the draft, under the perfect control of the engineer at his post.

The above-described plan for constructing and cleaning the screen is not the only one that could be resorted to to effect a similar result. A screen may be made of wire in such a manner that the brushes made of steel wire could be used to keep the openings clean, and the screen made to revolve in like manner; or the screen may be made to revolve by the force of the exhaust steam by putting curved rings or buckets onto the screen in such manner as to take the force.

What I claim as my invention is—

1. A movable or revolving screen, provided with scrapers to remove all of the soot and cinders that may adhere to both the out and in side of the same, and points to clean the apertures through which the smoke and exhaust steam escape, operated by its movement or rotation, as herein set forth.

2. A revolving screen provided with series of elongated apertures around the sides and top, in combination with an outer case, substantially as and for the purposes herein shown and described.

3. The series of arms I I on the base of the screen D, to remove the soot and cinders caught in and outside of the same, and discharge them at the place provided at each revolution of the screen.

In testimony whereof I hereunto subscribe my name.

JOHN DU BOIS.

In the presence of—
C. H. POOLE,
J. B. WOODRUFF.