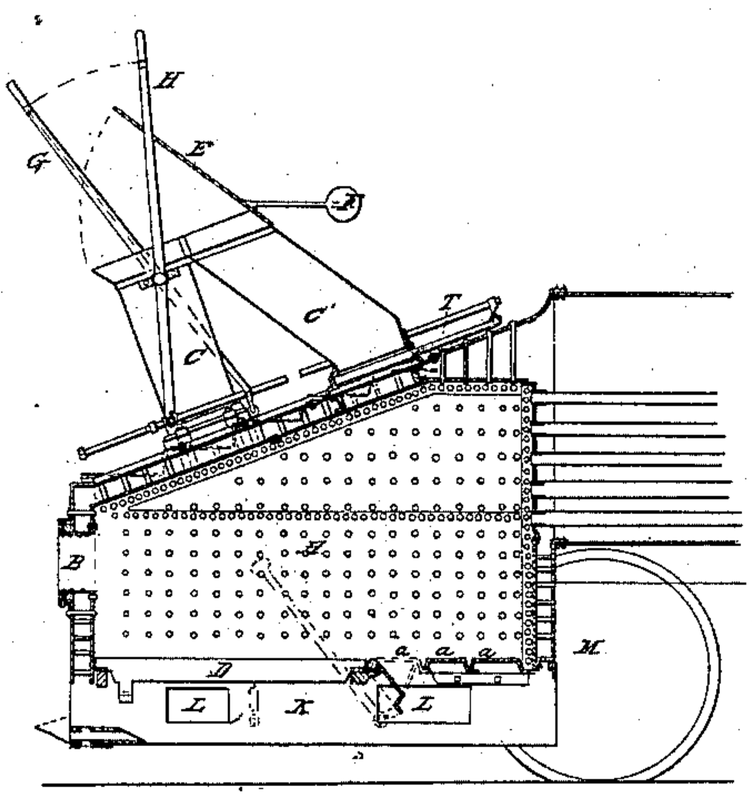
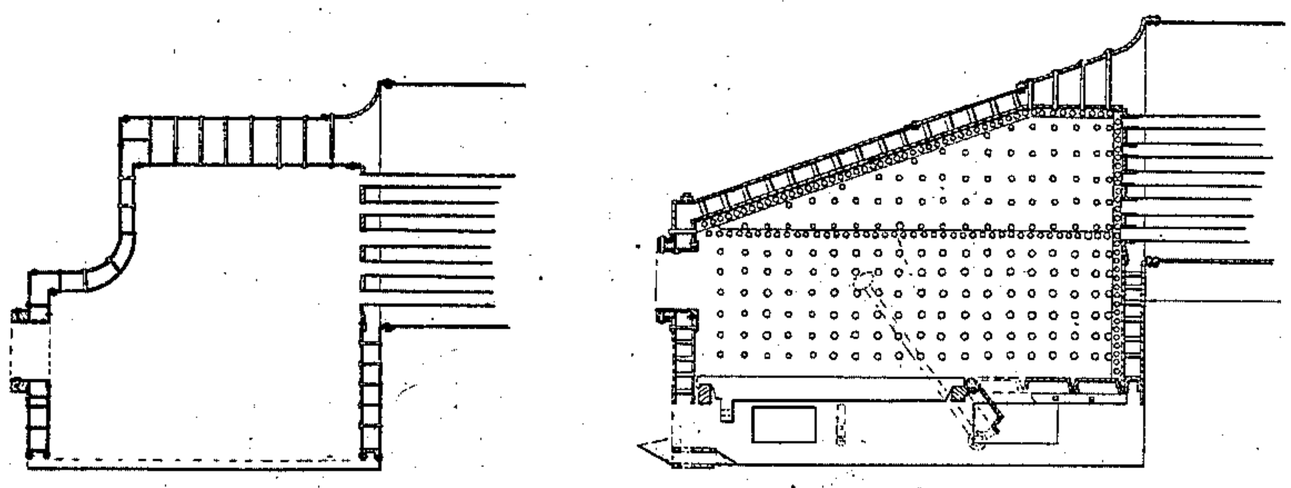
Sheet 1-2 Sheets.

R. & T. Winans,

Locomotive Tender,

No. 10,971. Patented May 23, 1854.





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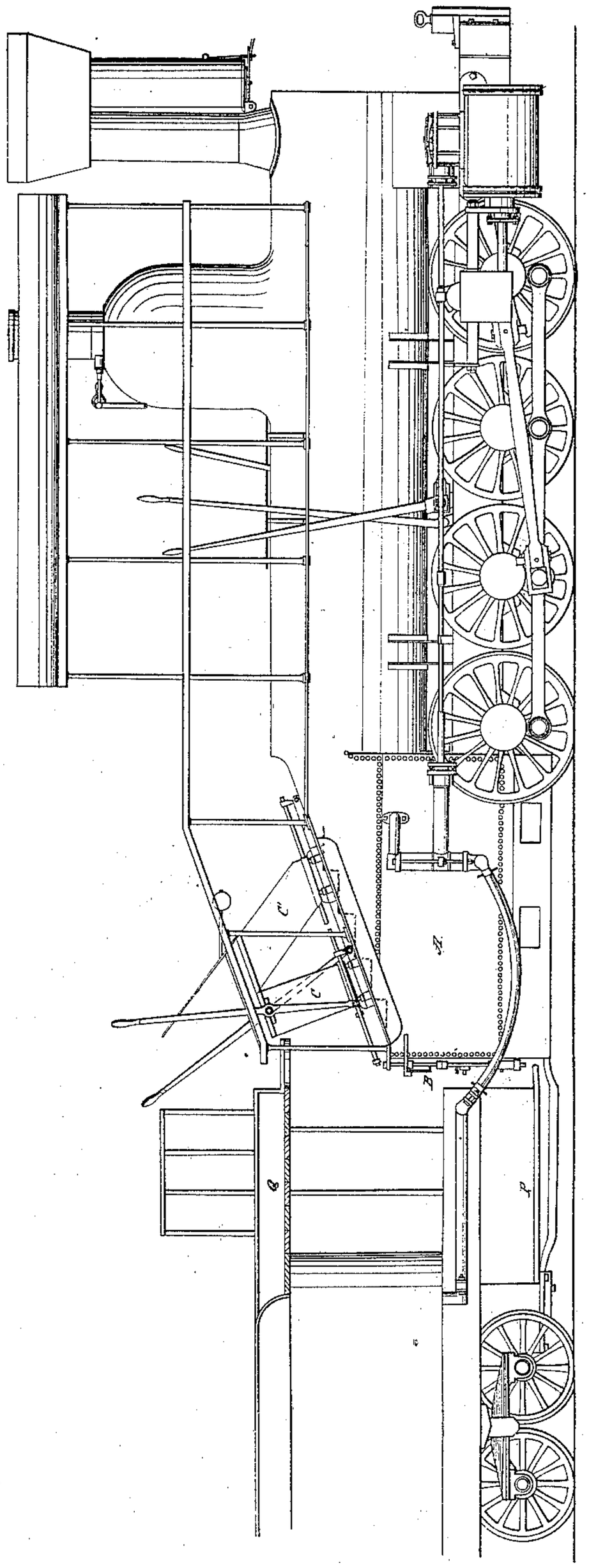

UNITED STATES PATENT OFFICE.

ROSS WINANS AND THOMAS WINANS, OF BALTIMORE, MARYLAND.

LOCOMOTIVE-TENDER.

Specification forming part of Letters Patent No. 10,971, dated May 23, 1854; Antedated May 9, 1854.

To all whom it may concern:

Be it known that we, Ross WINANS and THOMAS WINANS, of the city of Baltimore, in the State of Maryland, have invented a new and useful Improvement in Locomotive Steam-Engines to be Used upon Railroads, having particular reference to the burning of anthracite coal or bituminous coal in the state in which it comes from the mines, and that the following, in connection with the accompanying drawings, is a full and exact description of our said invention.

A better understanding of our invention will be had by looking, in the first place, at the drawings, and to those particulars, wherein, it is evident, on inspection, that they exhibit a machine differing from that in general use prior to the date of our invention.

See drawings Nos. 1 and 2. 1. The most striking difference will be recognized in the length of the fire box, and its peculiar shape. 2. Again, on the sloping top of the fire box, will be seen two feed-boxes, diverging from each other, and opening into the fire box at different points, through which fuel may be dropped, or fed, upon different parts of the grates. 3. And again, it will be seen, that the tender has two platforms for carrying fuel, one above the other, on either of which the fireman may stand when feeding the fire box with fuel.

It is in the dimensions and form of the fire box, the contrivances for the admission of fuel into it, and the platforms of the tender from which the fuel may be fed—thus apparent, on the drawing No. 1, without more particular reference, that our invention consists, the details of which we now proceed to describe.

In devoting himself to the improvement of the rail road locomotive engine for burning anthracite, or bituminous coal, Ross Winans, one of the present claimants, found that a large fire grate was essential to success, which, in its turn, required more than ordinary facilities to be afforded for access to the fire; and he found that these two objects could not be attained by a form of construction which placed the fire box behind the driving axle of the engine. This however, required changes, in other particulars, to prevent the weight of the enlarged fire box deranging the equal bearing of the gross weight of the machine on all its wheels—and, accordingly, the dome of the boiler, the house for the engine man, the valve gear, and platform from which it was worked, were transferred to the position in which they are shown in No. 1, and other changes, unnecessary to enumerate in this place, were made, the general result of which was to compensate the increase of weight behind the drivers, and preserve that adjustment of the gross weight upon all the wheels, that was desirable. The changes here referred to, and their results, are more particularly described in the specification accompanying an application for a patent, which the said Ross Winans, has, at this time, before the Patent Office; and they are referred to, now, mainly for the purpose of showing the point, from which the improvements, now proposed by us to be patented, began. In the machine just described, the said Ross Winans had obtained as large a fire box as he believed was practicable, consistently with other considerations affecting the subject. Still, experience left no doubt that a larger fire box was important in connection with the burning of anthracite, or bituminous coal, to the best advantage and we, accordingly, turned our attention to its enlargement. It had already been widened to the outer dimensions of the side pieces of the engine; so that there was no more room to be gained in this direction. All that could be done was to lengthen it. But the difficulty here, was that the additional material required for the purpose, and the greater leverage, at which the lengthening rearward, of the fire box, would make it act, would disturb that equalization of the weight on the wheels, which, as already stated, was essential to the proper operation of the machine; so that, the possibility of enlargement narrowed itself down to the possibility of enlarging the fire box, without

increasing its weight—the direction of its enlargement being endwise, only, and rearward,—and after much consideration and calculation, we determined upon an entire change in the form of the fire box, and ultimately found, that, by adopting the form which is shown in No. 1, we were enabled to increase the capacity of the fire box, endwise, and rearward, without increasing its weight or disturbing the equalization of the gross weight upon the wheels—so that, while the largest dimension, lengthwise of the road, of a fire box behind the driving axles had been sixty eight inches prior to our invention we were enabled to obtain one of ninety inches, being an increase of grate surface of thirty two per cent.—and this, not by a mere elongation, of the existing fire box, but by an elongation, due to a well adjusted arrangement of form, looking to the accomplishment of a result, without sacrificing in any degree, the value of the machine, in other particulars. The elongation of the fire box, thus obtained, besides increasing the area of the ignited coal, permitting it to be burned with a less draft, and with greater economy, permitted also a portion of the grate surface or bottom of the fire box to be made dead, or without opening for the passage of air through the fuel, as shown in No. 1, where a', a', a', represent the dead portion of the bottom of the fire box, one of the sections of which is represented as thrown open, by a lever, in dotted lines, to facilitate the discharge of the cinder, &c. On this dead surface, the ignition being less active than over the grate bars, the effect of it to burn the tube sheet, below the opening of the tubes, is less than if the draft were suffered to pass there, and the finer coal falls there, instead of being drawn through the chimney, to be wasted and lost. The advantages thus due to the dead portion of the fire grate, or bottom of the fire box, are consequences of the elongation of the fire box, which became practicable, in consequence of the change of form herein before referred.

The result thus obtained, led to the invention shown in the second of the differences already pointed out—that is, the mode of feeding from the top of the fire box through the two feed boxes shown in Nos. 1 and 2. The elongation of the fire box not only increased the quantity of grate surface therein, thereby increasing the difficulty of spreading the coal uniformly through the common fire door though still it was possible to spread it with useful effect in the usual manner, but subject to the disadvantage of keeping open the fire doors, thereby allowing for a corresponding increased tube for the cold air to be drawn through the tubes, while the fuel was being fed and spread. It at once therefore, became a matter of importance to obviate this objection to the elongation of the fire box; and hence, the contrivance by which the fuel might be dropped from the top upon the fire, a contrivance which was made perfect by bottoms to the feed boxes operated by a lever, as shown in Nos. 1 and 2, which being opened, after the boxes had been filled, and their tops shut down, admitted no external air, while they let the coal fall where it was desired, either without further necessity to be spread, or within the reach of a bar introduced horizontally for the purpose through a small opening in the common fire door exhibited in the drawings. Indeed, by keeping the feed boxes always full, and dropping the coal as wanted only, the fuel becomes warmed by its proximity to the furnace heat within the fire box, which still further promotes economy in its use. Thus, while the common fire door would be used in getting up the wood fire, with which the engine was ordinarily started, the feed boxes would be used for the balance of the trip.

The third of the differences already referred to, as visible upon inspection, that is, the double platform of the tender, follows as an invention, in the train, and as a consequence of the other two. The elevation of the openings for fuel, of the feed boxes made it necessary, or at all events most convenient to place the fireman where he could easily get at them—and hence the idea of projecting a platform from the tender for the purpose, on which he might stand, while feeding through the feed boxes; while, when feeding into the ordinary fire door, he might stand on the lower platform, which, as described in the specification, already referred to, of the said Ross Winans, now pending in the Patent Office, was made lower than usual, being brought within about a foot of the rails. On this lower platform he would stand too, when engaged in leveling his fire, shaking his grate bars, or feeding, when he saw fit to do so, through the lowest opening; because, while the top feed, so to call it, is placed within the power of the fireman, there was nothing to prevent his feeding in the other way, if it were deemed advisable to do so.

We do not limit ourselves to any particular length of fire box, for this must be comparative and be regulated by the engine, nor to the right lines and rectangles shown in the drawing for the top of the fire box may be rounded crosswise of the road, or made octangular, or many sided, and the slope, lengthwise, may be curved instead of straight, as we have drawn it. This construction of the fire box is made the subject

of a separate and contemporaneous application for Letters Patent and therefore we have not claimed it here.

What we here claim is—

The tender with an upper and a lower platform in connection with and for the purpose of feeding with greater convenience, the furnace of a locomotive steam engine having upper and lower feeding holes, substantially as herein described.

In testimony whereof, we the said Ross Winans and Thomas Winans hereto subscribe our names on this twenty third day of February 1854.

ROSS WINANS.
THOS. WINANS.

Witnesses:
Samuel Ringgold,
Jos. T. Atkinson.