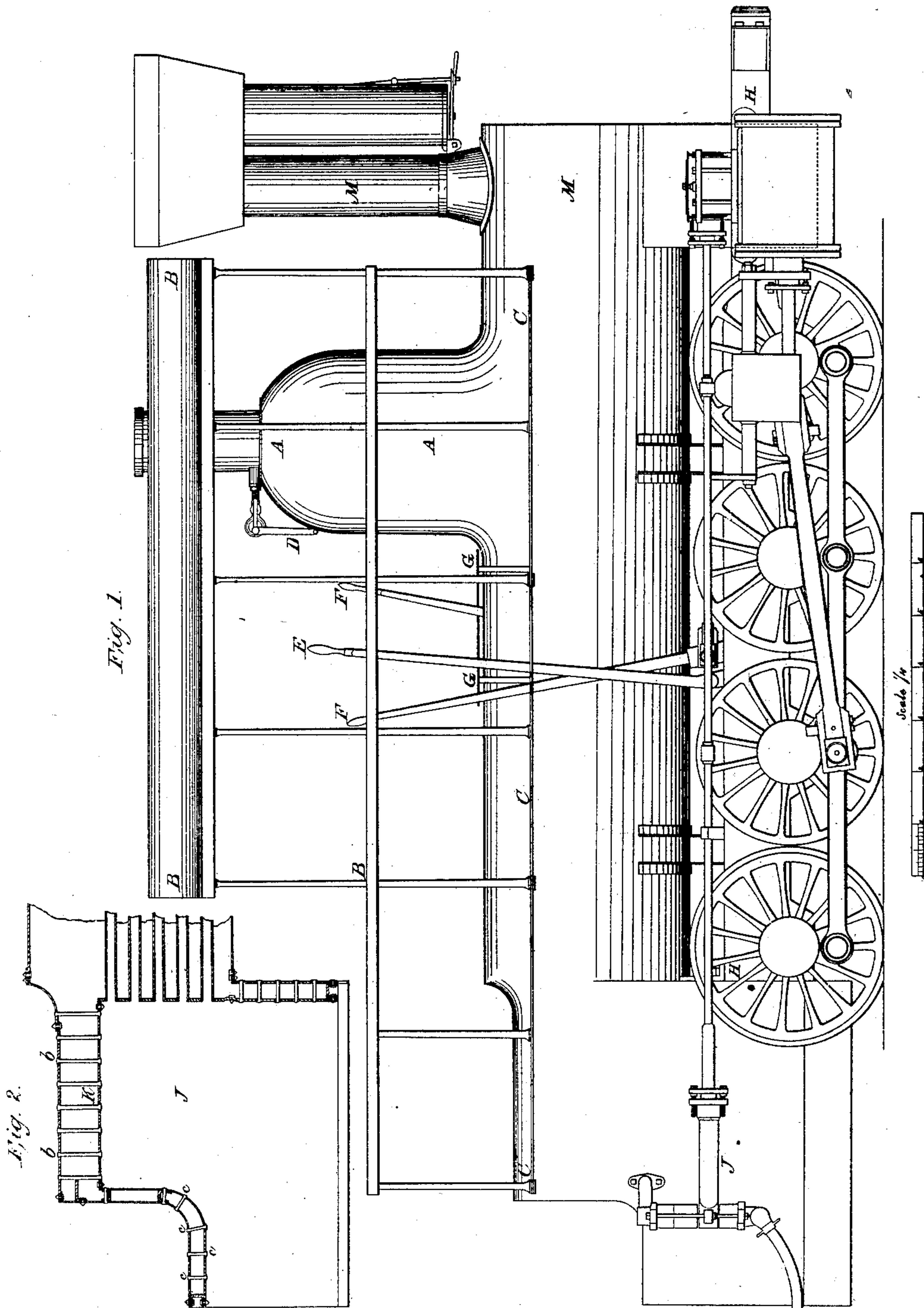


R. WINANS.

FURNACE OF LOCOMOTIVE BOILERS.

No. 20,117.

Patented Apr. 27, 1858.



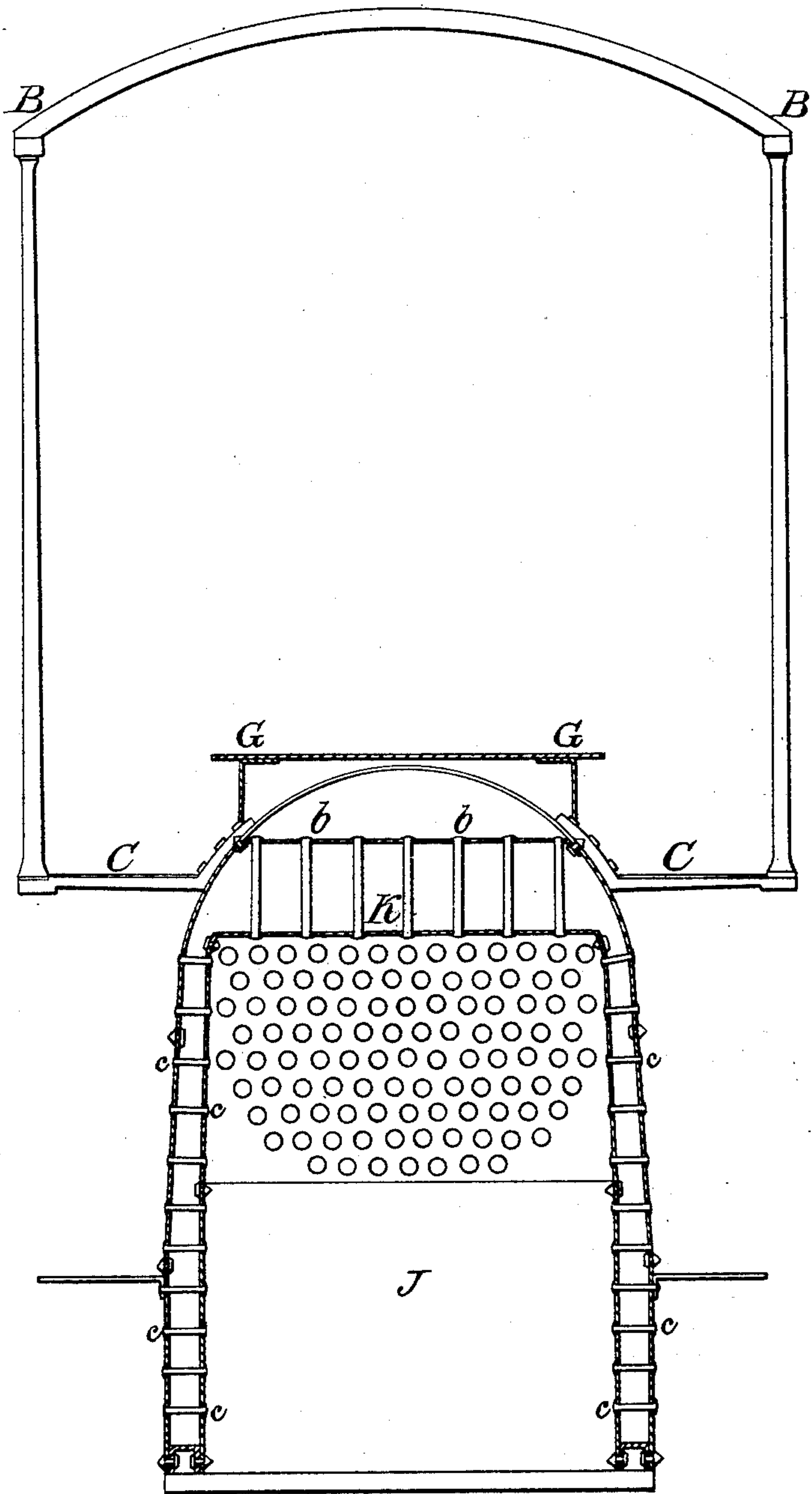
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Fig. 3.



UNITED STATES PATENT OFFICE.

ROSS WINANS, OF BALTIMORE, MARYLAND.

FURNACE OF LOCOMOTIVE-BOILERS.

Specification of Letters Patent No. 20,117, dated April 27, 1858.

To all whom it may concern:

Be it known that I, ROSS WINANS, of the city of Baltimore, in the State of Maryland, have invented a new and useful Improvement in the Construction of Locomotive-Engines for Railroads, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a side elevation of my improved locomotive. Fig. 2, a vertical longitudinal section of the fire-box, and Fig. 3, a vertical transverse section of the same. The chief object of my improvement is to adapt the locomotive to the burning of coal as a fuel without impairing its efficiency in other respects. It is well known that coal burns much more slowly than wood, and, in order to produce an equal quantity of steam in the same length of time, it is necessary to maintain a much larger quantity of coal in combustion; moreover coal, from the smaller size of its pieces, does not permit the air to pass through a heap of it as freely as it passes through a heap of burning blocks of wood and the combustion extends only a few inches above the grate, whatever may be the depth of the coal lying thereon; hence, in order to substitute coal for wood, a much larger area of grate-surface is required and this increased grate surface necessitates the employment of a much larger fire-box than is necessary or desirable when wood is used as fuel. In the boilers of stationary engines and in those of vessels where space can be easily obtained, this increase in the size of the fire-box can be made without difficulty and without alteration of the other parts of the mechanism; but in locomotives where the space is limited by a variety of circumstances and where the increase of the relative weight of a part of the boiler disturbs the proper distribution of weight upon the wheels, it becomes necessary, before the size of the fire-box can be increased to modify the arrangement and construction of both it and the other parts of the locomotive to prevent the efficiency of the engine, in other respects, from being impaired.

In locomotives as usually constructed, the frame to which the bearings of the axles of the wheels are secured, extends on each side of the fire-box and beyond the hinder extremity thereof, to sustain the bearings of a pair of wheels behind the fire-box: hence,

in such engines, the width of the fire-box is limited by the width between the side-beams of the frame; therefore, to procure an increased area of grate-surface for burning coal, the length of the fire-box must necessarily be increased. Such a mode of obtaining the requisite size of grate, would be objectionable in many respects and principally because it would be extremely difficult to distribute the coal, equally over the grate from the fire doors at the hinder end and to clean the grate-bars. Such an increased length would also separate the hinder axles by too great an interval, making it more difficult for the locomotive to traverse curves in the road.

My invention consists in a new mode of constructing, combining and arranging the various parts of a locomotive engine in such manner as to obtain an enlarged fire-box, suitable for burning coal advantageously, without interfering with the working of the other parts of the engine.

In order to obviate the difficulty of firing a long fire-box and of cleaning the grate thereof I have increased the width of the fire-box beyond the width of the space between the sides of the frame which sustains the bearings of the axles of the wheels. In order to obtain this increased width the arrangement of the frame and wheels are altered, for, as the fire-box is made to occupy the space previously occupied by the rear portion of the frame, the frame is made to terminate at the forward end of the fire-box, and the wheels are all arranged in a series in advance of the fire-box. My improvement therefore consists in combining together a fire-box wider than the space within the frame, a frame terminating at the forward end of the fire-box, and the whole series of wheels of the locomotive placed in front of the fire-box and is represented in the accompanying drawings as applied to a locomotive engine having eight connected driving wheels whose axles are all situated in front of the fire-box. The boxes of these axles are sustained by the frame H, which terminates at the forward end of the fire-box J. In this example, the hinder pair of wheels overlap the sides of the fire-box; consequently the width of the latter does not exceed the space between the wheels; it is wider however, than the space within the frame which terminates, as before mentioned, against its forward end. The crown sheet, K, of the fire-

box is connected by stays *b b*, with the exterior shell, and the latter is depressed, as shown in the drawings, so that barely sufficient space is left for the free circulation of
5 water and the escape of steam. The mode of securing the stays which I prefer is to tap a screw thread in the holes through which the stays are inserted and to cut a corresponding screw-thread upon the stays. The
10 latter are then screwed into the holes and they are of such length that when in place, their ends project the usual distance beyond the faces of the plates for riveting, and are riveted up.
15 The house, *B B*, for the engineman is, in this instance, placed upon the body of the boiler, between the hinder end of the fire-box *J* and the smoke-box *L*, and in rear of the smoke-pipe or chimney *M* and it covers
20 the steam dome *A* at the hinder quarter of which the engineman generally stands. The floor of the engine house is formed by two foot-boards *C C*, which extend from the hinder part of the fire-box to the smoke-
25 box, and by a platform *G G*, which enables the engineman to pass freely from one foot-board to the other and furnishes an ample space for tools. The throttle valve lever *D*, is situated at the hinder side of the steam
30 dome in a convenient position for the en-

gineman, and the reversing-lever *E* and the starting bars *F, F*, for operating the valves by hand, are also extended into the engine-house *B B*.

I have represented and described my improvement as applied to a locomotive with eight drivers, but it is obvious that the number of wheels may be increased or diminished without affecting my invention. In the example here shown the fire-box is wider
40 than the inside of the frame, the width being limited only by the hinder pair of wheels which overlap it. If however, these wheels were placed a little farther forward, the width of the fire-box could be still further
45 extended and its length correspondingly diminished.

What I claim as my invention and desire to secure by Letters Patent is,

The construction and arrangement of the locomotive engine substantially as herein set forth so as to obtain a fire-box of greater
50 width than the space within the main frame.

In testimony whereof, I have hereunto subscribed my name.

ROSS WINANS.

In presence of—

F. F. IJAMS,

P. H. WATSON.