G. R. Comstock,

Furnace Grate.

No. 14,153. Patented Jan. 29, 1856.

Fig. 1

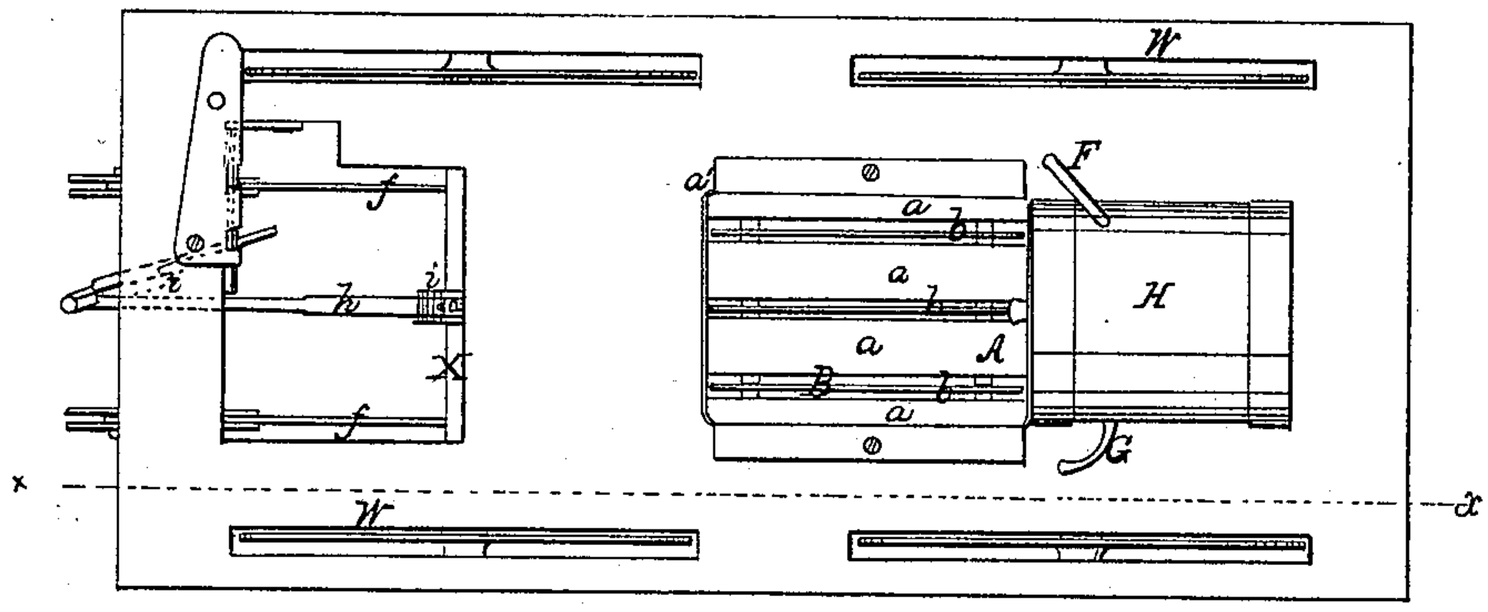


Fig. 2.

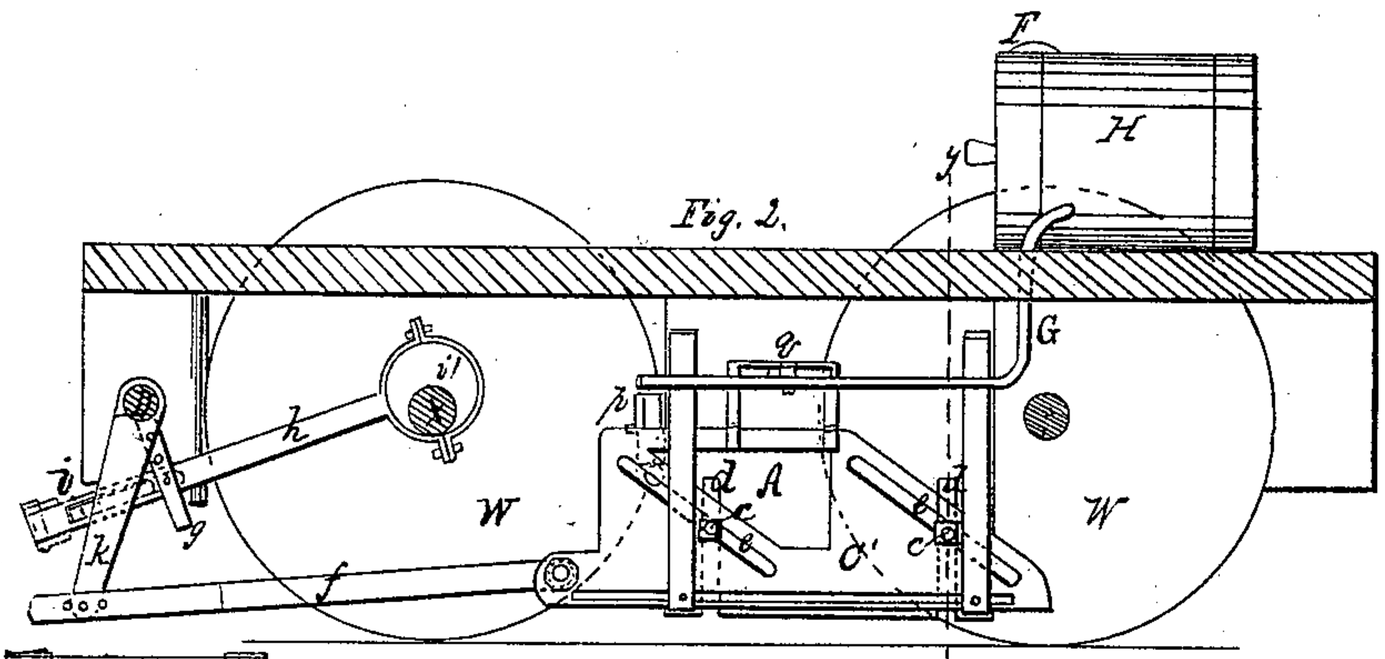


Fig. 3

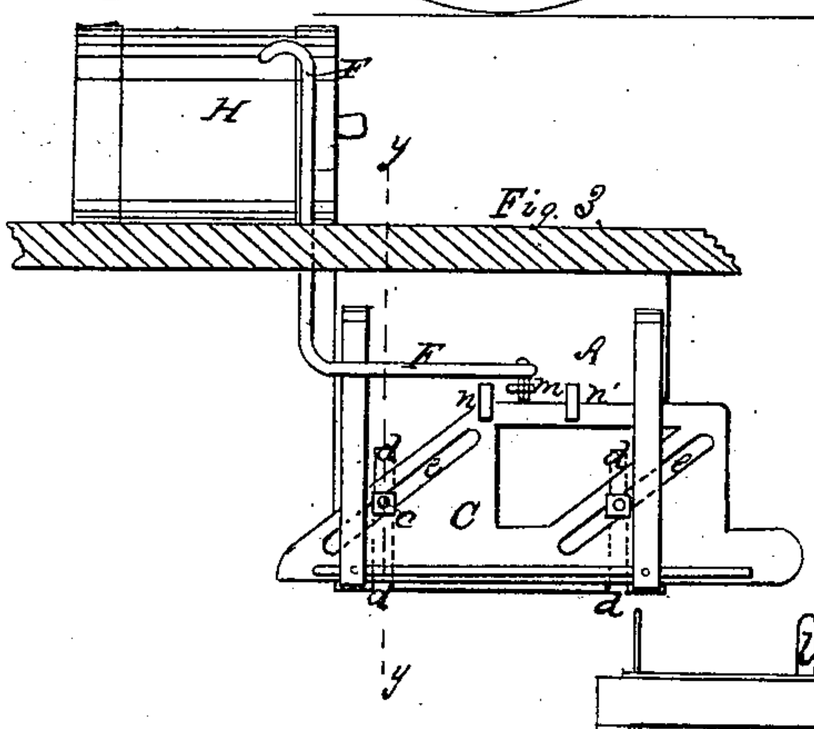


Fig. 4

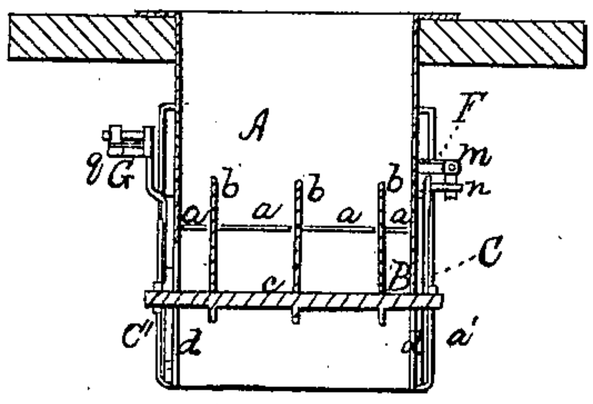
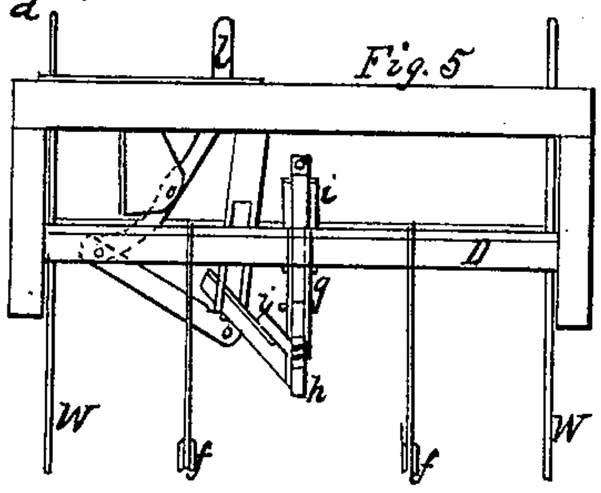


Fig. 5



UNITED STATES PATENT OFFICE.

GEO. R. COMSTOCK, OF MANHEIM, NEW YORK.

LOCOMOTIVE FURNACE-GRATE.

Specification of Letters Patent No. 14,153, dated January 29, 1856.

To all whom it may concern:

Be it known that I, GEORGE R. COMSTOCK, of the town of Manheim, State of New York, county of Herkimer, have invented a new and useful Improvement in Apparatus for Aiding the Combustion of Fuel in Locomotive-Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, forming part of this specification, in which—

Figure 1 is a plan, showing grate and boiler of locomotive together with apparatus for operating movable grate and boiler cocks. Fig. 2 is a vertical section on *x x* of Fig. 1. Fig. 3 is an elevation of side *a'* of furnace. Fig. 4 is a section of furnace on line *y y*. Fig. 5 is a front elevation of apparatus operating movable grate and boiler cocks.

Similar characters denote the same part.

The nature of my invention consists in the construction of the furnace with a vertically movable supplementary grate, supported in inclined slots of vertical plates on each side of the furnace, so that the reciprocation of the plates shall produce the rise and fall of this grate between the bars of the stationary grate; and also in so arranging the cocks of two pipes leading from the boiler, that the reciprocation of these plates shall open said cocks for letting water upon the grate as it rises, and admitting steam to the furnace as the fuel is stirred by said rise of the grate; the cocks closing as the grate descends, this reciprocation of the plates being produced from the revolution of one of the driving axles, by the connection of said plates with the arm of a rock shaft moved by an eccentric on the said axle, at the will of the engineer, by means of a stop applied and removed as will be set forth. It is here premised that the rising grate for stirring the fire is of itself not considered as constituting any portion of this invention.

The following description and annexed drawing fully sets forth the details of construction and operation.

The several parts are thus represented:—A, furnace, having ordinary grate bars *a*, between which are vertically movable the bars *b* of the movable grate; B, movable grate, supported upon shafts *c* moving in vertical slots *d* of furnace sides, and also resting in the inclined slots *e* of movable side plates C C′, by the movement of which the shafts *c* are operated; C C′, movable side plates, connected with shaft D by rods *f*, so that a partial rotation of said shaft will produce a translation of the said side plates, and so raise and lower the movable grate; D, shaft in rear portion of engine, having a slotted arm *g*, within which is the movable rod *h*, strapped to the eccentric *i'*, upon main shaft X. To the rear extremity of rod *h* is hinged a stop *i*, operated by lever *l*, as shown in Fig. 5, said stop when folded filling the slot of rod *h*, so that by reason of a pin in arm *g* the rod *h* will be prevented from reciprocating through the slot of arm *g;* and as a consequence the shaft D will be partially rotated at each revolution of the wheels W, and through arms *k* move rods *f;* F, pipe leading from the upper portion of boiler H, and opening into the furnace: the cock *m* being operated by the arms *n n'* of side plate C so as to open as the inclined planes *e* raise the grate and shut as the grates fall; G, pipe leading from lower portion of boiler, and after passing through a cooler *p* connected with the tank, opening by jet apertures upon the grates that rise, just below the fixed grates, the cock *q* being opened by the side plate C′ simultaneously with the rise of the grate B.

The operation of this apparatus is as follows: When the apparatus is not designed to be used, the lever *l* has the position shown in Fig. 5, and then the running of the engine does ont affect it. But when by the movement of lever *l* the stop *i* is placed in position as in Fig. 2, then the reciprocation of the side plates C C′ is produced, causing the rising of grate B as seen in Fig. 4, and the opening of the two cocks of pipes F and G, and the simultaneous close of the same with the fall of the grate.

The effect of the admission of the steam into the furnace, at the opening of the fuel, caused by the rise of the grate, does not here require demonstration, neither does the advantage of the cleansing and moistening of grate B; the scope of this invention being the means by which the result is effected.

I am aware that grate frames, with numerous vertically moving fingers to stir and clean the fires of locomotives have been used by Nichols and Boyes as shown in their pat-

ent of 1850. I therefore make no claim to the device of the moving grate. Neither do I claim of themselves the eccentric or rods by which the slides are moved, but

I claim—

The simultaneous raising of the grate B and opening of pipes F and G at will, for aiding the combustion of fuel in the furnace, during the running of the engine, by the combination of reciprocating plates C C′ and stop rod *i*, and parts connected therewith, or devices equivalent thereto.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

GEO. R. COMSTOCK.

Witnesses:
HENRY LINK,
WM. HIGBIE.