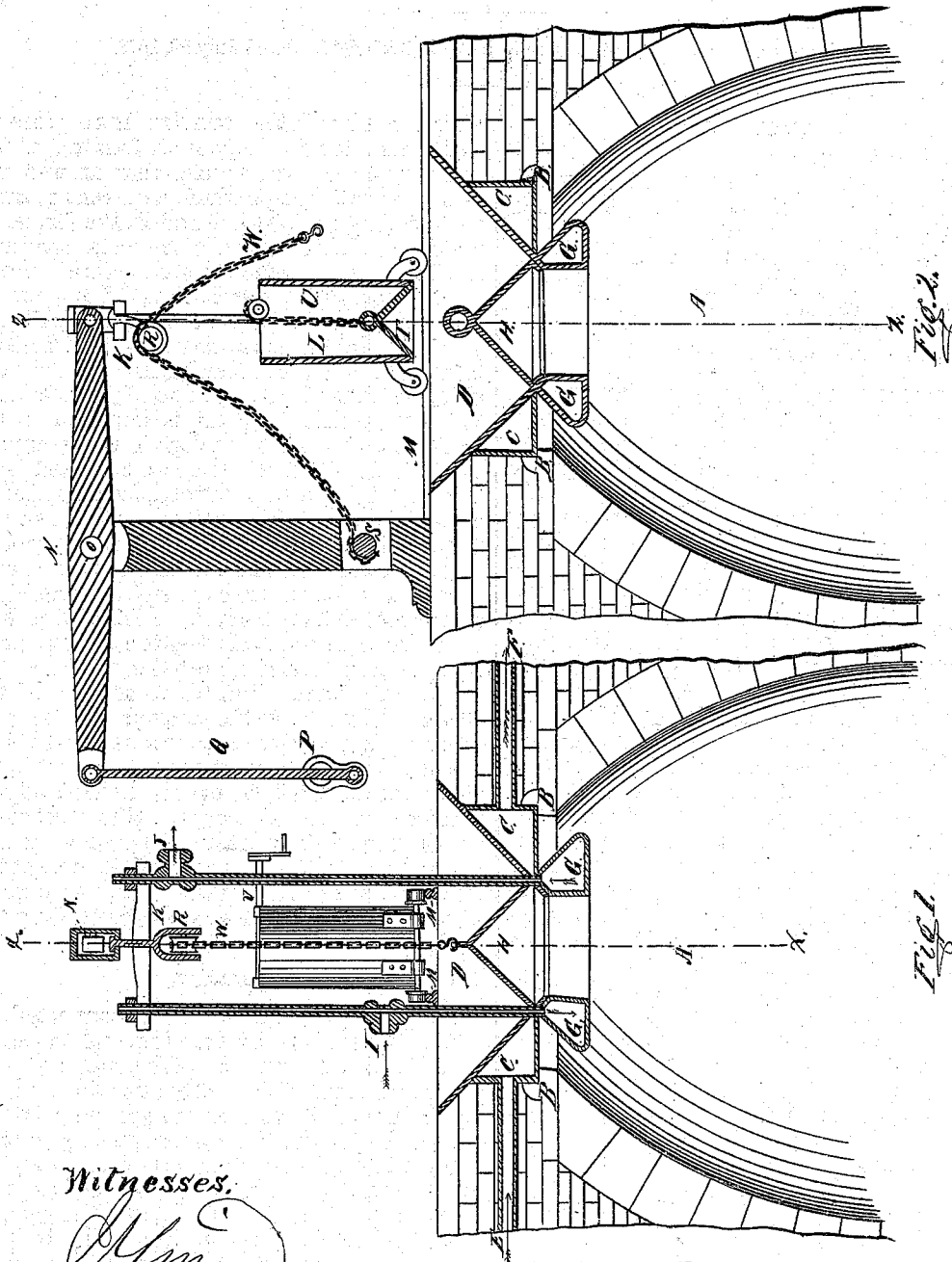


L. S. GOODRICH.

Improvement in Apparatus for Feeding Blast-Furnaces.

No. 129,813.

Patented July 23, 1872.



Witnesses.

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IMPROVEMENT IN APPARATUS FOR FEEDING BLAST-FURNACES.

Specification forming part of Letters Patent No. 129,813, dated July 23, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that I, LEVEN S. GOODRICH, of Waverly, in the county of Humphreys and State of Tennessee, have invented certain new and useful Improvements in Apparatus for Feeding Blast-Furnaces, of which the following is a specification:

Nature and Object.

The object of my invention is to procure an apparatus for feeding blast-furnaces that will withstand the destructive influences of heat in contact therewith for a greater length of time than those now in use, and to be perfectly adjustable in every part, that the same may be removed with but little expense of time or labor. The nature of my invention is to produce an air circulation through the ordinary cone used in blast-furnaces, in connection with the cup or the lower section of a divided cone that has a cylinder passing through its center and connected therewith in such a manner that I can practically combine the use of a box with a valvular bottom that will distribute and equalize the stock around the cone by its own gravity. The ordinary cone in use with the cup is raised or lowered by a rod or chain connected to its apex and lever by which it is moved. The upper section of a divided cone is moved the same way. It was formerly designed to sustain and move the lower section of the divided cone by rods that were to be operated beneath the hopper, so as to admit the combined use of the equalizing-charger; but in practice this was found attended with many difficulties; consequently this labor-saving and important device had to be dispensed with. My next object is to protect the metal hopper from the damaging effects of heat by the use of an annular air-circulating chamber, as hereinafter described.

General Description with Reference to the Accompanying Drawing.

Figure 1 represents a vertical section of my apparatus through the lines *z z*. Fig. 2 represents a vertical section of the same through the lines *x x*.

A is a section of the top of a blast-furnace, upon which is placed B, an annular base, upon

which is placed the annular angle-piece C, which sustains the hopper D, forming, at the same time, an annular chamber around the said hopper, through which a current of air is produced by the pipes E and F, the former of which supplies the air and the latter conducts it off. G is another annular air-chamber, being located at the bottom of hopper D, upon which rests the cone H, which combines with the said G, and forms a continuous cone extending down into the furnace A. The annular chamber G is suspended by-pipes I and J, through which also air is supplied to the same, entering first through I and escaping through J. Said pipes are suspended by a cross-head, K, to which is attached a pulley or sheave, R, over which a chain or cable passes from another pulley or winch, S, to the cone H in such a manner that the same may be connected to raise or lower the said cone H, or disconnected therefrom, at pleasure. L is a car provided with a valvular bottom, T, sustained by the chain W and operated by shaft V. M M is a rail-track situated at the top of the hopper D, leading to the stock-yard, the object of which is to deliver coal or other material to the said hopper directly over the cone H, by which means it will be evenly distributed and equalized around said cone. N is a beam oscillating upon the fulcrum O, one end of which is connected with the cross-head K, and at the other end with the crank P by connecting-rod Q, or other suitable device for oscillating the same.

Operation.

Suppose the chain W to be disconnected, as shown in Fig. 2 of my drawing, and the car L to be filled with coal or other material, and moved on track M, directly over the cone H. By the use of valve T at the bottom of L the coal is discharged into hopper D, equalizing itself around the said cone H by its own gravity. Now, if it is desired that this charge of coal shall be delivered to the in-wall of the furnace A, the annular air-chamber or valve G is lowered by means of pipes I and J, to which they are connected at the bottom, and at the top to cross-head K, which connects with the beam N, which is oscillated by crank P, being connected therewith by rod O, as shown. The lowering of said G produces an annular open-

ing between it and the bottom of hopper D, through which the charge of coal passes, directed by the cone H, which remains in connection with said G during the operation; though, had it been desired to deliver the charge to the center of said A after having been equalized around the cone H, the car L would have been moved from over cone H and the chain W connected with the eye in said cone, by means of which the said cone H would have been raised while the annular chamber or valve G remained stationary, through the center of which the charge would then pass, directed by the hopper D. It may be here stated that the annular angle-piece C, the hopper D, and cone H may all be raised by one operation to any desired height by the rods I and J, the annular chamber or valve G, and connections therewith. It may also be stated that the said angle-piece C may rest on the top of furnace A in such a manner as to avoid the use of ring B, and many devices may be employed instead of the beam N for the purposes for which it is designed; therefore,

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. The combined air-chamber and valve G, as and for the purpose above set forth.

2. The combination of pipes I and J with the chamber G and cross-head K, substantially as and for the purpose above set forth.

3. The annular angle-piece C for the combined purpose of supporting and forming an annular air-circulating chamber around hopper D, substantially as described, in connection with pipes E and F, for the purpose above set forth.

4. The combination of the pipes I and J, the cross-head K, sheaves R and S, the beam N, and chain W, for the purpose above set forth.

5. I finally claim the combination of the combined air-chamber and valve G with pipes I and J, cross-head K, beam N, or its equivalent, angle-piece C, hopper D, pipes E and F, sheaves R and S, chain W, car L, valvular bottom T, chain U, shaft V, and track M, all as arranged, for the purposes set forth in the above specification.

LEVEN S. GOODRICH.

Witnesses:

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