(No Model.) 2 Sheets—Sheet 1.

W. H. EMERSON & J. SKINNER.

BITUMINOUS COAL BREAKER.

No. 433,777. Patented Aug. 5, 1890.

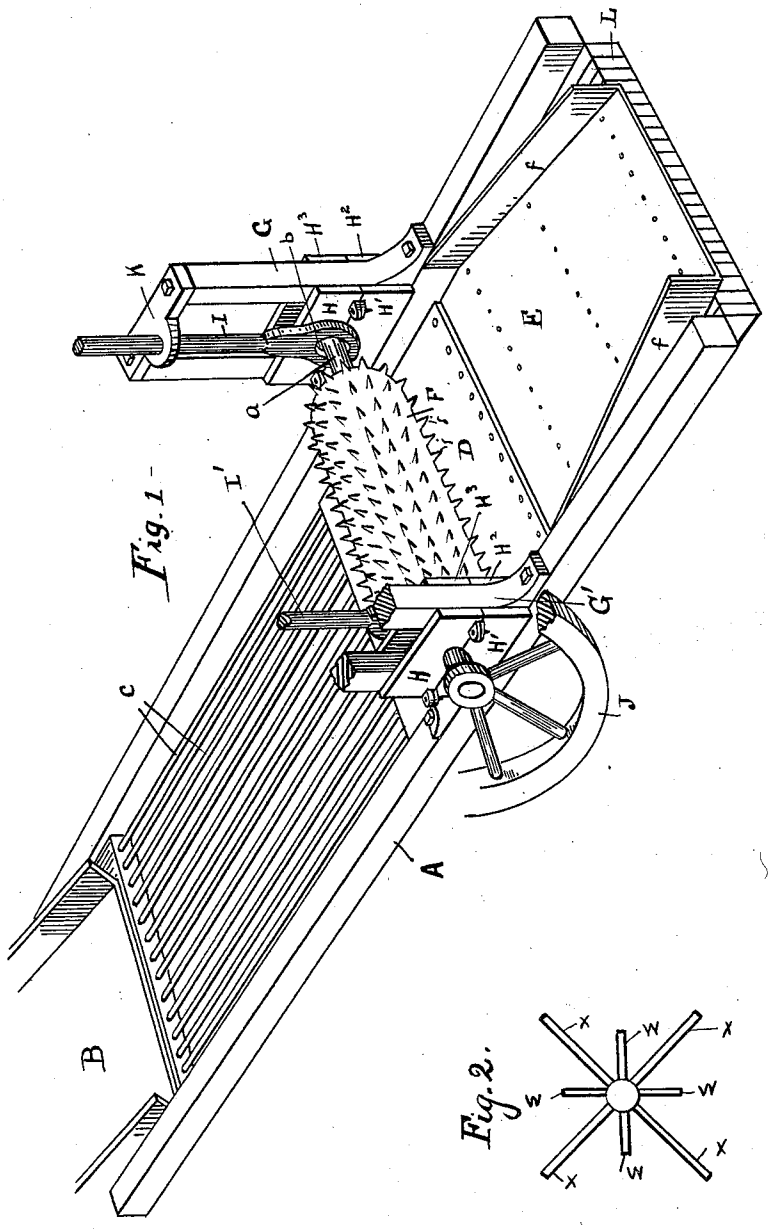


Fig. 1.

Fig. 2.

Witnesses—
C. A. Tefft
R. N. McConnick.

Inventors.
William H. Emerson
John Skinner
by W. V. Tefft - atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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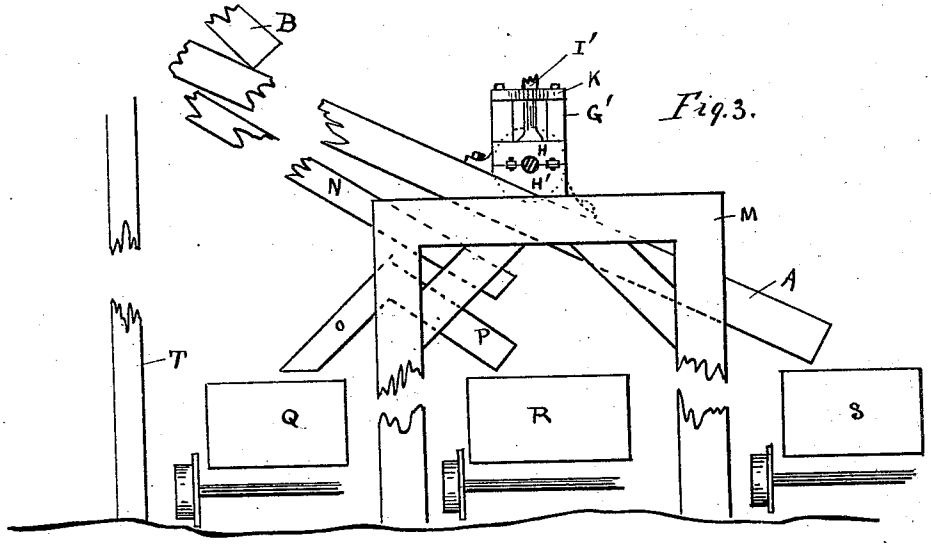


Fig. 3.

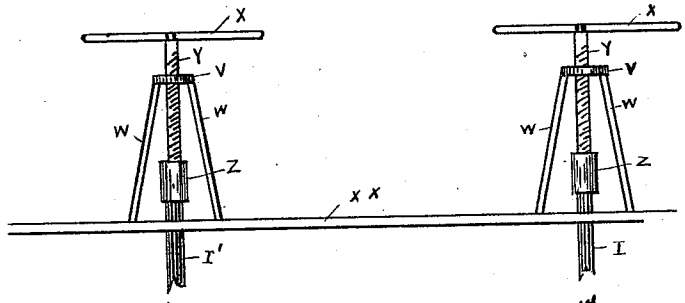
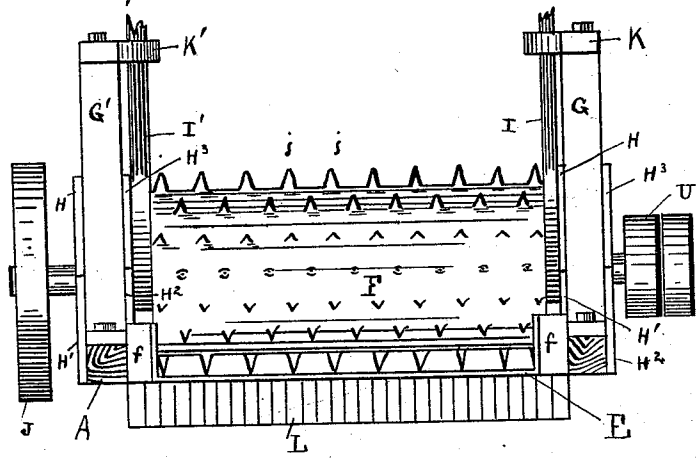


Fig. 4



Witnesses.
C. A. Tefft
R. N. McConnell

Inventors
William H. Emerson
John Skinner
by W. V. Tefft-atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM H. EMERSON AND JOHN SKINNER, OF DUMFERMLINE, ILLINOIS.

BITUMINOUS-COAL BREAKER.

SPECIFICATION forming part of Letters Patent No. 433,777, dated August 5, 1890.

Application filed April 11, 1890. Serial No. 347,547. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. EMERSON and JOHN SKINNER, citizens of the United States, residing at Dumfermline, in the county of Fulton and State of Illinois, have invented certain new and useful Improvements in Bituminous-Coal Breakers; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to certain new and useful improvements in coal-breakers, the particular object of which is to provide a device in mechanical construction which will effectually break the coal without crushing and pulverizing it, and which can be so varied in operation as to break the coal into large or small chunks, and also capable of such adjustment as to allow coal to pass under it without breaking it.

That our invention may be more fully understood, reference is had to the accompanying drawings, in which—

Figure 1 shows a perspective view of our improved coal-breaker properly adjusted on a coal chute or bent for operation. Fig. 2 is a detail view showing the arms of the capstan used to raise and lower the cylinder. Fig. 3 shows a plain side view of chutes or coal bents so adjusted as to deliver coal into proper cars with our improved crusher mounted in position for operation. Fig. 4 shows a plain front view of our improved coal-breaker, showing the means of raising and lowering the cylinder or breaker.

A and L refer to the frame construction of the coal-chute.

B is a chute, which receives the coal when dumped from the cars.

C refers to the screen-bars; D, to a steel plate; E, to sheet-metal covering for the bottom of the chute.

f f are guide-boards, which form a small chute at the lower extremity of the main chute.

G G and K form a frame-work, in which are carried and operated journal bearings or boxings.

H H′ H″ H‴ refer to plates properly bolted onto the sides of the frame-work G G′, and connected with the journal and journal bearing or boxing in such a manner as to operate, in connection with the journal bearing or boxing, for raising and lowering the cylinder. The said cylinder F, being provided with a central shaft on which it rotates and which said shaft continuing out from the ends of the cylinder, provides the journal *a a′*. The said cylinder F, being properly journaled in the bearings before described, has also another journaled bearing in the rods I I′, which said rods are flattened or enlarged at their lower extremities and provided with the openings *b* to receive the journal *a a′*.

J represents a fly-wheel properly adjusted on the end of the journal *a*.

In Fig. 3, M and T are portions of the trestle-work, which, together with proper cross-connections, support the bents or chutes designated by A, and N B is a section of a small chute which receives the coal from the cars when dumped. O and P are also chutes, which give direction to the falling coal, so that it will be conducted into the several cars. Q R S are cars in place for receiving the coal after having been properly separated by means of the different chutes, screens, &c. G′ and K show a frame-work, in which is carried journal-bearings formed by the conjunction of H H′, inclosing a block-boxing. I′ shows a suspending-rod. A is the main chute or bent, which carries or in which operates the coal-breaker, which constitutes our improvement.

In Fig. 4, F is a cylinder, on which are spiked or otherwise fastened the teeth *i i*, &c., arranged in alternate or regular order, the said cylinder F being provided with a central axis, which terminates at its ends in the journals *a a′*, which said journals are carried in boxings, which said boxings are free to move up and down in frame-works made up of G G′ and K K′, the said boxings being held in place and combined with the plates H, H′, H″, and H‴. U is a belt-wheel on one end of the journal or shaft. J is a fly-wheel on the other end of the journal or shaft. I I′ show suspension-rods. X X show a floor or other support, on which is carried capstans, and through which the said suspension-rods pass and connect with the capstans. Z is a circu-

lar boxing, which connects the suspension-rods I I′ with the screws Y Y′. The capstan is formed by the parts W W W, which are bound together at the top with the cap V. X X X X form the arms or levers which operates the screw Y. A and L and also F F refer to parts of the frame-work of the chute.

It will be understood that the frame-work and the different bents or chutes herein shown are only shown for the purpose of showing the adjustment and the manner of operation of the improvement herein specified, and that it may be understood how the coal is disposed of after being dumped from the cars we will suppose that the coal is dumped from a coal-car into the chute B, which conducts it upon the screen-bars C, &c., where it will be seen that the fine or slack coal at once passes through the bars of the screen C, &c., as does also the small pieces of coal commonly called "nut-coal," and are received on another screen, in which the screen-bars are placed closer together, so that the nut-coal, falling from the screen above, will be carried on and down the chute, (shown by letter N in Fig. 3,) and finally deposited into the car, (designated by the letter R;) but the fine or slack coal passing through both screens falls directly into the car, (designated by the letter Q,) or upon the chute (shown by O,) and finally conducted into the proper car; but the large chunks, commonly called "lump-coal," are carried on and down the chute and upon the steel plate D, which extends under the cylinder of the coal-breaker. Now the coal-breaker or heavy cylinder being rapidly rotated by means of proper connections with steam-power, the strong teeth or spikes contact with the chunks and instantly break them in pieces and carry the coal so broken under the cylinder and it passes on and down the chute into the car. Now, in order that the coal may be broken in different sizes it is necessary that the cylinder be raised or lowered to accommodate itself to the breaking of the coal in the various sizes desired. We accomplish this by the means above specified—that is, by means of journal-bearings so constructed as to operate up and down in the frame-work. (Shown by the letters G G′.) The cylinder, as above specified, is raised by means of the suspension-rods I I′. Now, by means of these rods being carried upward and through the floor, as shown in Fig. 4, and operating in connection with the capstan and screws Y Y′, the said cylinder is variously and easily adjusted, and may be raised to such a height that it will not contact with coal passing down the chute and under it; and, further, it will be seen that the said suspension-rods I I′ are enlarged at the lower end and provided with the holes *b* to permit the passage through of the journal *a;* and it will also be seen that there is a considerable space in the flattened portion of the rod above the journal, which space or opening enables the journal to raise without the operation of the rod I. This will be seen to be an advantage when we consider that in some coal there will be found strata of very hard substance which cannot be broken and which, in its passage down the chute and under the cylinder, would either break the teeth or stop the cylinder were it not that the cylinder would raise from its bearings sufficiently to allow the passage of such hard substance.

The capstan, with hand-wheel for operating the suspension-rods, may be used or any suitable means.

Having thus fully described our improvement, what we claim, and desire to secure by Letters Patent, is—

1. In a coal-breaker, the cylinder F, provided with the teeth or spikes *i i* upon its surface, the journal *a*, the boxings formed by a metal block and the plates H H′ H² H³, the frame-work formed by G, G′, and K, with the journal *a*, carrying on one end suitable belt-wheels and on the other end the fly-wheel J, the suspension-rods I I′, with openings *b* in the flattened ends forming a bearing for the journal *a*, the collars X X′, connecting the suspension-rods I I′ and the screws Y Y′, and the support formed by the parts W W V, having a threaded opening in the part V, substantially as described and set forth.

2. In combination in a coal-crusher, the chute B, the frame A, the screen-bars C, the framing L, the sheet-metal covering E of the said framed bottom of said chute, the frame-work G G′, bolted to the frame-work A and forming guideways for the journal bearings or boxings H H′ H² H³, and between which guideways the said boxings may be elevated or lowered, the cross-plates K K′, forming a bearing and retaining in a proper position the vertical suspending-rods I I′, the suspending-rods I I′, encircling the cylinder-shaft *a* and capable of raising and lowering the same, the said rods I I′ being retained in a proper position by the cross-plates K K′ and being raised or lowered by the male portions of the thread-shaft Y Y, engaging in the female portions of the threaded standards V V, the said elevating shaft or screws Y Y being connected with the said suspension-rod I I′ by means of the collars Z Z′ and being rotated by means of the hand-wheels X X, the cylinder shaft or journal carrying the fly-wheel J at one extremity and the fast and loose band-pulleys U at the other extremity, and the said shaft having its bearing in the boxings carried in the bearings H H′ H² H³ and carrying the spiked crushing cylinder or roller F, having the spikes *i i* thereof arranged in alternate and regular order, which said spikes are capable of being removed and replaced as occasion may require, all substantially as herein set forth and described.

3. In combination with the coal-breaker F, with suitable shaft for rotating, the boxings formed by metal blocks and the plates H H H H, the frame-work formed by the parts G G′ K, in which the boxings are carried and

operated, the belt-wheel U, and the fly-wheel J, carried on the ends of the shaft *a*, all substantially as described and set forth.

4. In combination with the cylinder F, having on its surface the spikes or teeth *i i*, and having a suitable rotating shaft, the boxings formed by metal blocks and the plates H H′ H^2 H^3, the frame-work formed by the parts G G′ K, in which the boxings are carried and operated, the belt-wheels U, and the fly-wheel J, carried on the ends of the shaft, the suspension-rods I I′, with the openings *b* in the flattened ends of the rods I I′, forming bearings for the shaft *a*, the collars Z Z, connecting the rods I I′ and the screws Y Y, and the supports formed by the parts W W V, the part V having a threaded opening in which the screw Y is carried and operated, all substantially as described and set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM H. EMERSON.
JOHN SKINNER.

Witnesses:
W. V. TEFFT,
R. N. MCCORMICK.