

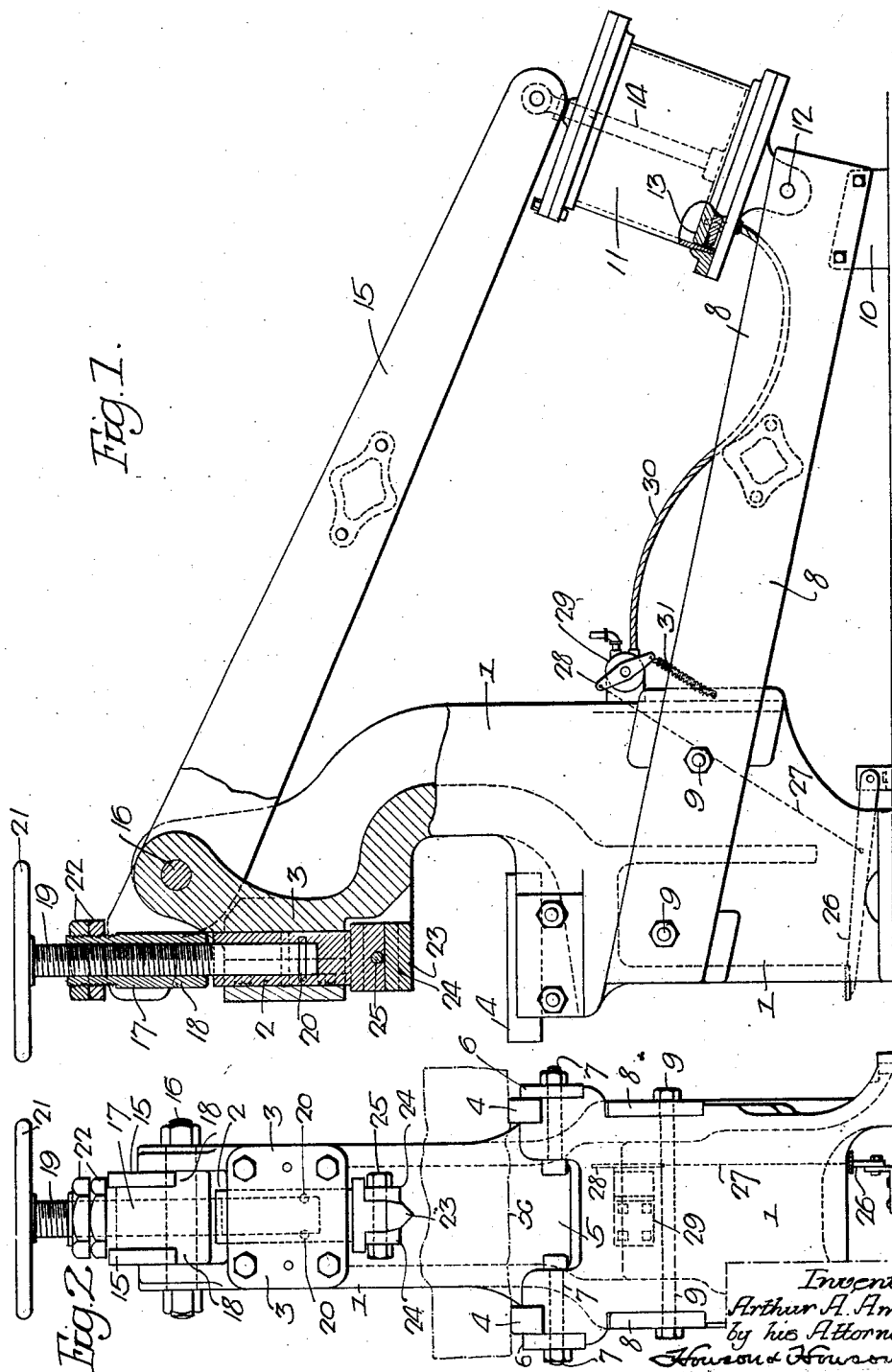
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PIG IRON BREAKER

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PIG-IRON BREAKER.

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To all whom it may concern:

Be it known that I, ARTHUR A. AMBLER, a citizen of the United States, residing in New Brunswick, New Jersey, have invented certain new and useful Improvements in Pig-Iron Breakers, of which the following is a specification.

One object of this invention is to provide a substantial rugged and convenient machine for breaking pig iron into such lengths as are required to permit of their being easily charged and melted in a furnace:—the invention more especially contemplating a power operated device whereby ordinary lengths of pig iron may be quickly broken in half with the expenditure of a minimum of power and without danger to the operator of the machine.

A further object of the invention is to provide a power operated pig iron breaker including a novel form of slidable head and operating lever and the invention includes relatively simple means for removably connecting a breaking tool to said head.

These objects and other advantageous ends I attain as hereinafter set forth, reference being had to the accompanying drawing, in which—

Fig. 1 is a side elevation, partly in vertical section, illustrating a machine constructed in accordance with my invention; and,

Fig. 2 is a front elevation of the machine shown in Fig. 1.

As shown in the drawing the machine has a main frame which includes a relatively heavy frame body 1 preferably in the form of a casting, having its upper portion overhung to provide a vertical guide-way for a slidable head 2.

Below this over-hung portion 3 of the frame are mounted two parallel hardened bars 4, preferably spaced at equal distances on opposite sides of the line of movement of the head and having the frame cut away between them as indicated at 5. Said bars are preferably rectangular in section and rest on suitable plane portions of the frame where they are clamped by retaining plates 6, held in position by horizontal bolts 7. Said bars project above the adjacent portions of the frame and serve as widely separated, supports for lengths of pig iron to be broken, of which one is indicated in dotted lines at 8.

The main frame of the machine also includes two parallel beams or bars 8—8 con-

nected to the frame body 1 on opposite sides thereof. These beams are connected to the frame body and to each other at the front end by bolts 9. As clearly shown in the drawing the frame body 1 is formed with lugs or shoulders at the tops and bottoms of the bars 8—8 to assist in holding them in position. The said bars at their opposite or rear ends are connected together by a supporting block or member 10 so as to constitute a floor engaging brace or foot for the frame. Said block pivotally supports a motor such as a steam or hydraulic cylinder 11, which is permitted to swing in a vertical plane between the rear ends of the beams 8 on a horizontal pivot 12, and has operative within it a piston 13, which through a suitable rod 14, is connected to the outer end of the long arm of an operating lever 15.

This lever, which is fulcrumed by a pin or pivot 16 to the upper part of the frame body 1, is preferably made of two similar bars rigidly connected and having the two ends constituting its short arm extended on opposite sides of a shoe or nut 17. This shoe has on its opposite sides abutments 18, engaged by the branches of the short arm of the lever 15. When the shoe is in the form of a nut, as preferred, it is threaded on an adjusting screw 19, whose lower end rotatably engages the sliding head 2, to which it is held by pins 20, extending into an annular groove in its lower end. The upper end of the screw 19 has fixed to it a hand wheel 21. A pair of nuts 22 are threaded on the upper end of the shoe or nut 17, so as to be engaged by the top edges of the branches of the lever 15, which branches are thus confined between said nuts and the abutments 18. The nuts 22 make it possible to effect adjustments to accommodate variations in the thickness of the bifurcated end of the lever 15, which variations may be due to inaccuracies of initial construction or due to wear.

The lower end of the head 2 has a sharp edged breaking tool 23, clamped to its flat lower face by a pair of cheek pieces 24, for which purpose the opposite sides of the said tool are inclined, while the cheek pieces correspondingly formed to engage the inclined surfaces of said tool to which they are held by a clamping bolt 25, extending transversely through them and through the lower portion of the head 2.

The admission of fluid under pressure to the cylinder 11 is controlled by a foot lever 26, connected through a rod or cable 27 with the operating arm 28 of a fluid controlling valve 29 conveniently located on the frame 1. This valve governs the flow of fluid under pressure from a suitable source to a pipe 30 connected to one end of the cylinder 11 and is normally held in its closed position by a spring 31 acting on the controlling arm 28.

With the above described arrangement of parts, a length of pig iron to be broken is placed on the two bars 4—4 after which the foot lever 26 is pressed downwardly, thus opening the valve 29, and admitting fluid under pressure to the cylinder 11 under the piston 13. As a consequence the piston is raised in the cylinder and the short arm lever 15 is moved downwardly, thus bringing the sharp edge of the breaking tool 23 into engagement with the length x of pig iron along a line substantially midway between the supporting bars 4. As a consequence the piece x is broken at about its middle point as desired. When the foot lever 26 is released, the spring 31 so operates the valve 29 that the fluid is permitted to exhaust from the cylinder 11, and the weight of the long arm of the lever 15, plus that of the piston 13, then restores the parts of the machine to the positions illustrated in the drawings. The broken pieces of pig iron may now be removed and another length to be broken, placed upon the bars 4—4.

If either of said bars 4—4 should become broken or otherwise injured they may be conveniently removed and replaced by loosening the nuts on the bolts 7 and thus loosening the clamping plates 6. Likewise, if the breaking tool 23 should become broken or dulled, it likewise may be replaced with the utmost ease by loosening the nut on the bolt 25.

From the above description, it will be appreciated that the machine, while relatively light, is none-the-less rugged and not easily damaged. It is moreover conveniently portable and may be operated at high speed to perform by power the work which is customarily done by hand. Its construction is simple and by means of the hand wheel 21, the head 2 with the tool 23, may be quickly adjusted to permit it to properly act on pieces of pig iron of widely varying dimensions.

I claim:

1. The combination in a breaking machine, of a frame having a floor engaging foot spaced rearward from the main body thereof; two separated supports thereon for a body to be broken; a vertically reciprocable head operative in a line between said supports; a guide for the head; a breaking tool carried by the head; and a lever pivoted to

the frame for actuating said head to cause the tool to break a body mounted on the supports; and a motor for operating the lever connected with the frame at a point closely adjacent the said foot.

2. The combination in a breaking machine, of a frame, comprising a main cast body and a rearward extending beam separate from the body and rigidly connected therewith; a floor engaging foot at the rear end of the beam; two separated supports on the frame body for a piece to be broken; a vertically reciprocable head operative in a line between the supports; a guide for the head; a breaking tool carried by the head; a lever pivoted to the frame for actuating the head to cause the tool to break a piece mounted on the supports; and a motor for operating the lever connected with the beam at a point closely adjacent the said foot.

3. The combination in a breaking machine, of a frame, comprising a main cast body and a rearward extending beam having two separate parts on opposite sides of the body and rigidly connected therewith; a floor engaging foot connected with both parts of the beam at the rear ends thereof; two separated supports on the frame body for a piece to be broken; a vertically reciprocable head operative in a line between the supports; a guide for the head; a breaking tool carried by the head; a lever pivoted to the frame for actuating the head to cause the tool to break a piece mounted on the supports; and a motor for operating the lever connected with the beam at a point closely adjacent the said foot.

4. The combination in a breaking machine, of a frame, comprising a main cast body and a rearward extending beam having two separate parts on opposite sides of the body and rigidly connected therewith; integral shoulders on the frame body engaging the tops and bottoms of both beam parts to hold them in position; a floor engaging foot connected with both parts of the beam at the rear ends thereof; two separated supports on the frame body for a piece to be broken; a vertically reciprocable head operative in a line between the supports; a guide for the head; a breaking tool carried by the head; a lever pivoted to the frame for actuating the head to cause the tool to break a piece mounted on the supports; and a motor for operating the lever connected with the beam at a point closely adjacent the said foot.

5. The combination in a breaking machine, of a frame, comprising a main cast body and a rearward extending beam having two separate parts on opposite sides of the body and rigidly connected therewith; a floor engaging foot connected with both parts of the beam at the rear ends thereof; two separated supports on the frame body

for a piece to be broken; a vertically reciprocable head operative in a line between the supports; a guide for the head; a breaking tool carried by the head; a lever pivoted to the frame for actuating the head to cause the tool to break a piece mounted on the supports; a power cylinder pivotally connected between the two parts of the beam at the rear ends thereof; and a piston in the cylinder operatively connected with the lever for actuating the head.

6. The combination in a breaking machine of a frame; two separated supports thereon for a body to be broken; a reciprocable head operative in a line between said supports; a nut adjustably connected to the head; a lever having a short arm engaging the nut; a motor for actuating the lever to operate the head; and a breaking tool for the head.

7. The combination in a breaking machine of a frame; two separated supports thereon for a body to be broken; a reciprocable head guided on the frame to move in a line between said supports; a threaded member rotatively connected to the head; a nut adjustably mounted on said threaded member; a lever having a short arm operatively associated with said nut; and a motor for actuating the lever to move the head toward a body to be broken on said supports.

8. The combination in a breaking machine of a frame; two separated supports thereon for a body to be broken; a head

slidably guided on the frame and having a breaking tool; a threaded member rotatively engaging the head and having a hand wheel thereon; a nut adjustably mounted on said threaded member and having abutments; a lever fulcrumed on the frame and having a bifurcated arm engaging the abutments of the nut; with a motor operative on the long arm of the lever.

9. The combination in a breaking machine, of a frame, comprising a main cast body and a rearward extending beam; an operating shoe connected to the head and having opposite abutments thereon; a lever fulcrumed on the frame and having a bifurcated arm engaging the abutments of the shoe; an adjustable nut threaded on the shoe and adapted to be engaged by the said bifurcated arm; and a motor for operating the lever.

10. The combination in a breaking machine of a frame; two separated supports thereon for a body to be broken; a head slidably mounted in the frame and having a flat lower face; two cheek pieces mounted on opposite sides of the head and extending toward each other below the same; a breaking tool having inclined sides engaging the said cheek pieces and having a flat upper face held by said pieces against the flat face of the head; and means for actuating the head to cause the tool to break a body on the supports.

ARTHUR A. AMBLER.