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A. E. BROWN.

LEVELER FOR COKE OVENS.

APPLICATION FILED APR. 11, 1908.

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3 SHEETS—SHEET 1.

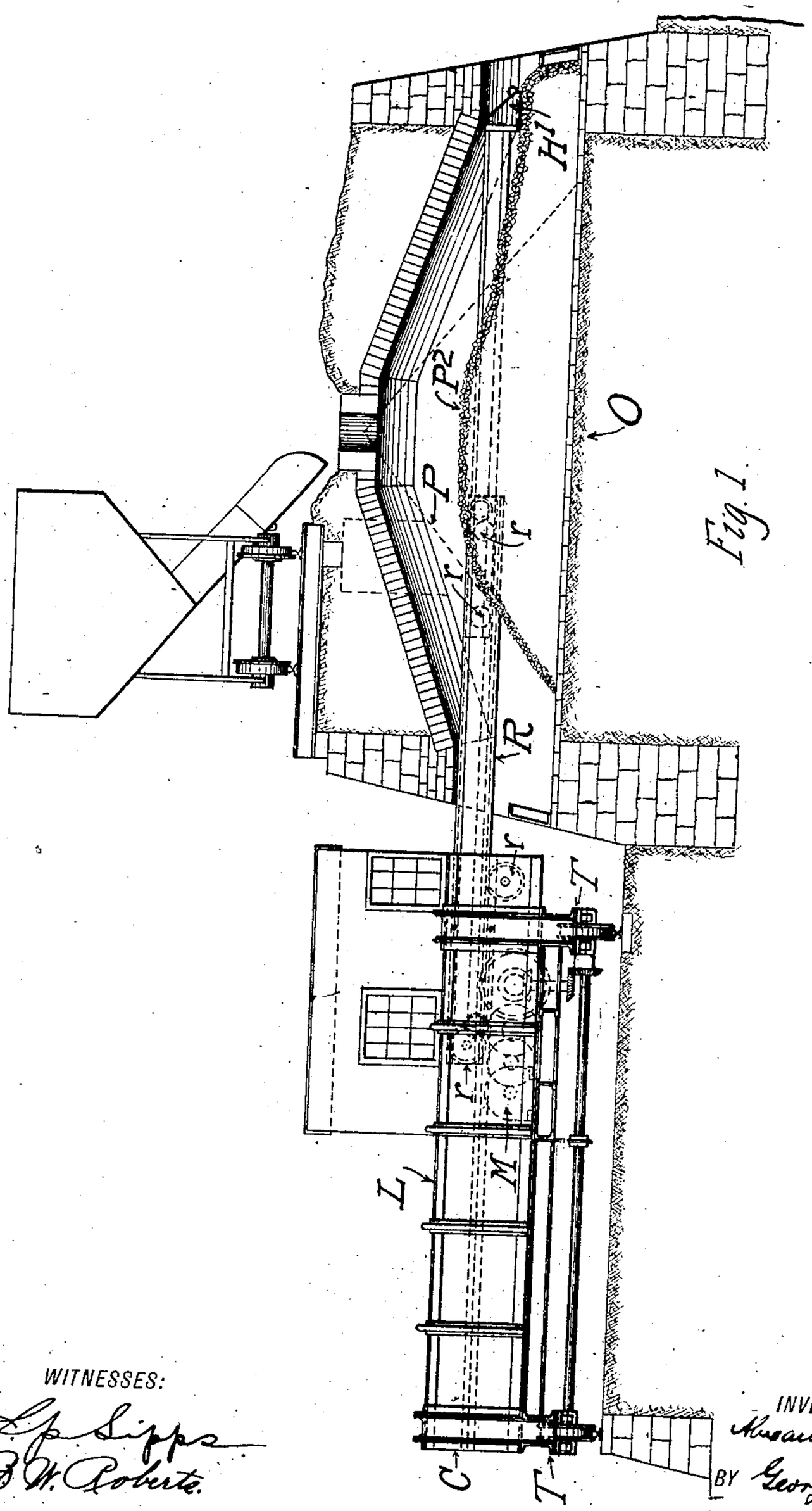

Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 2.

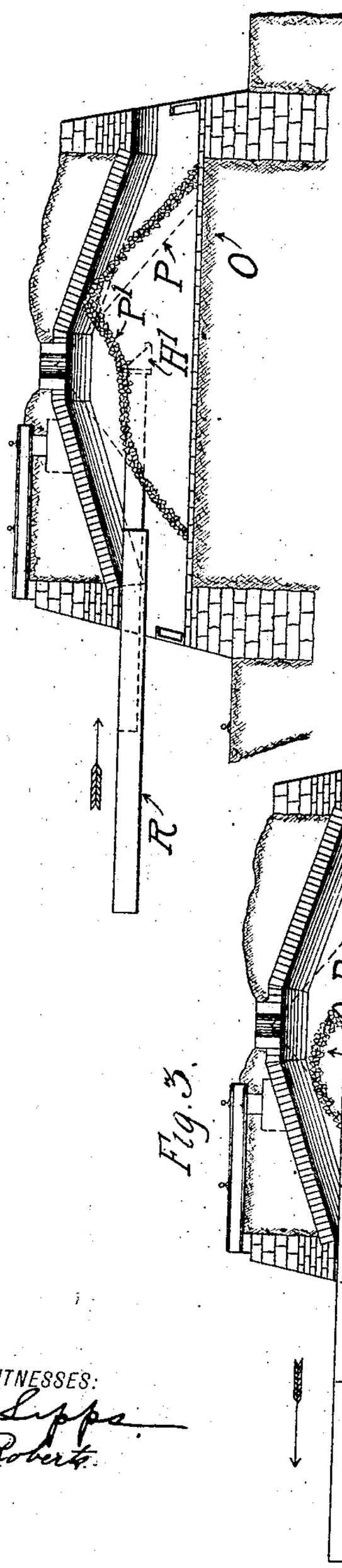
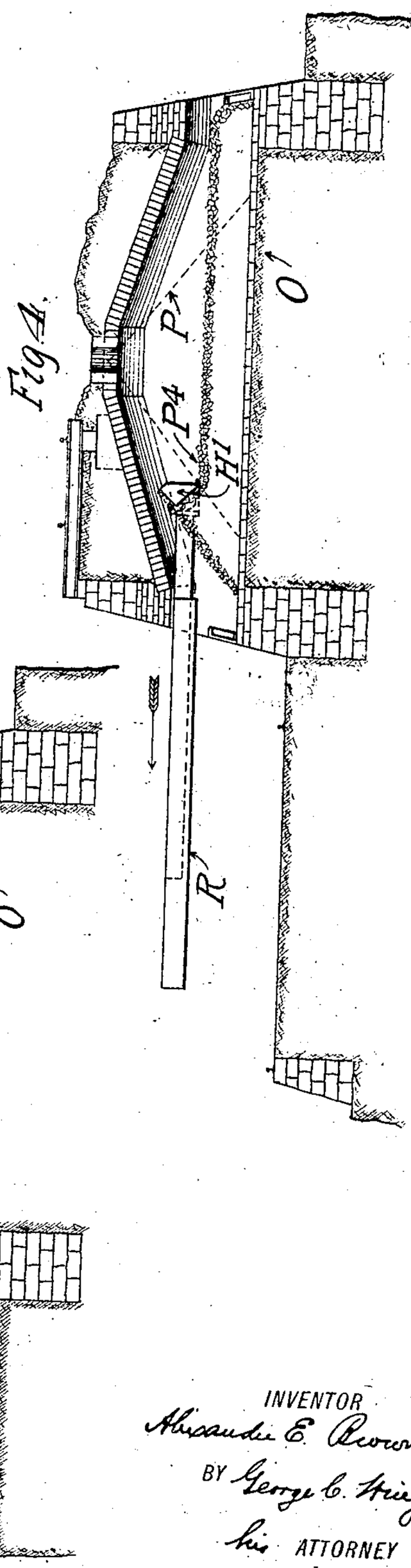


Fig. 3.

Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

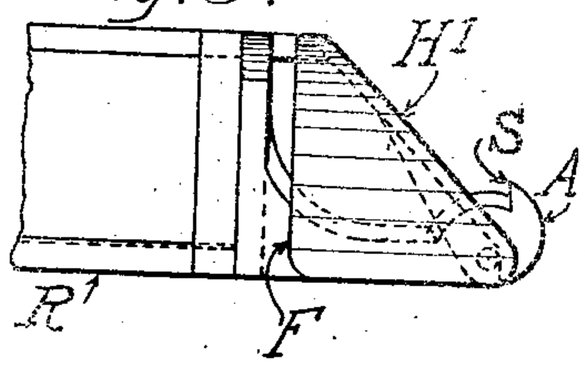


Fig. 6.

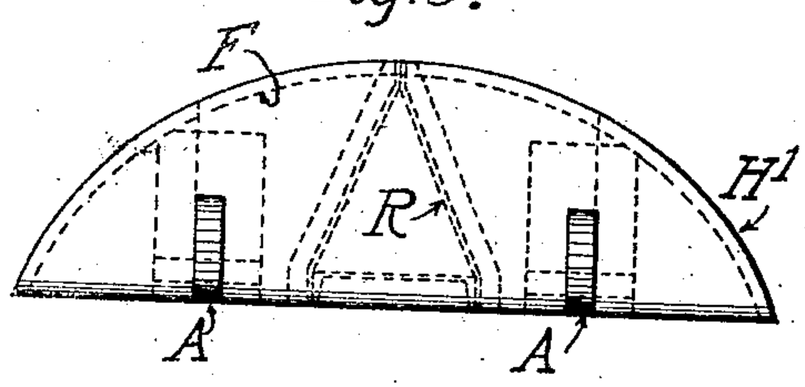


Fig. 7.

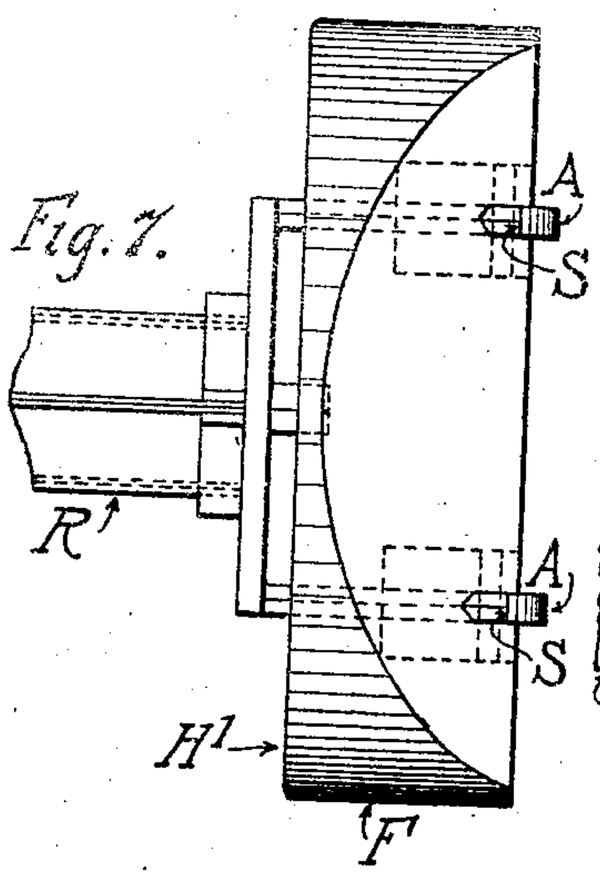


Fig. 8

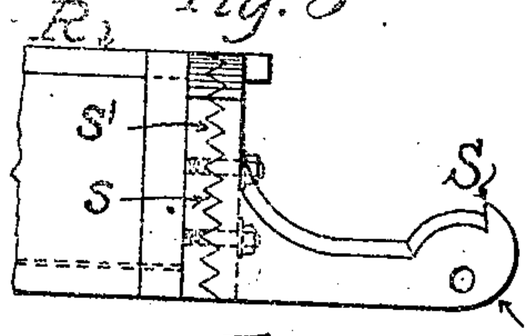


Fig. 9.

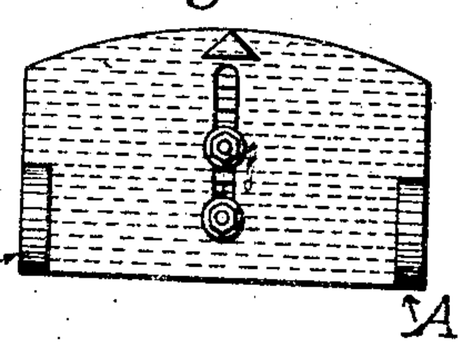


Fig. 10.

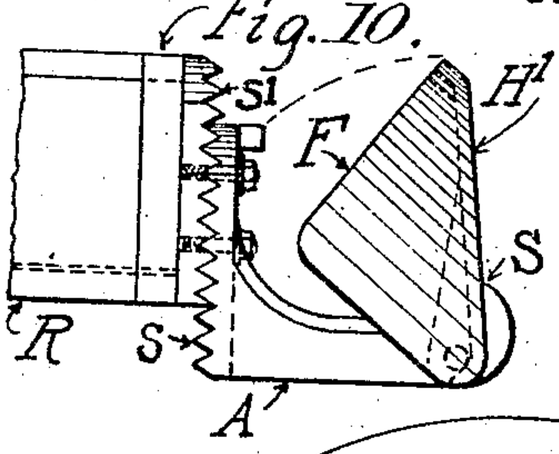


Fig. 12.

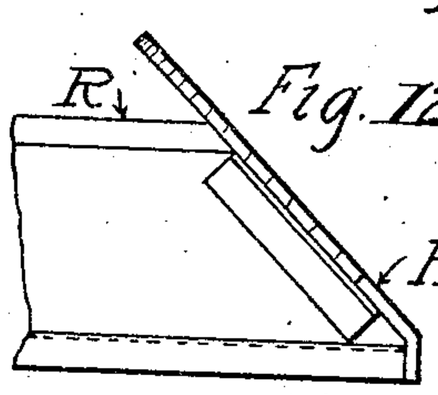
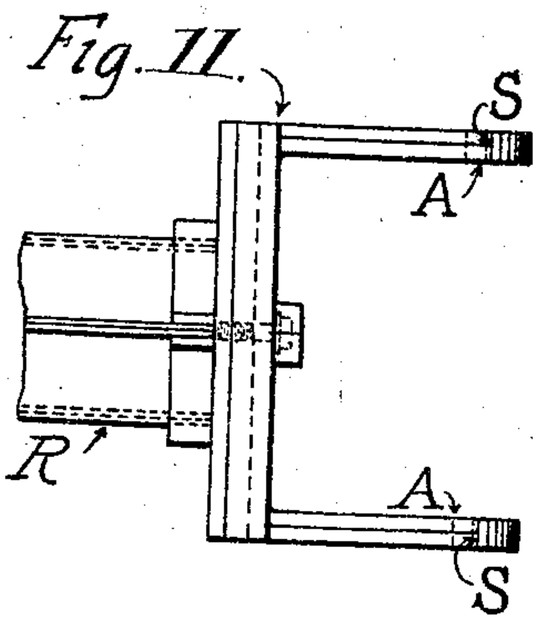


Fig. 11.



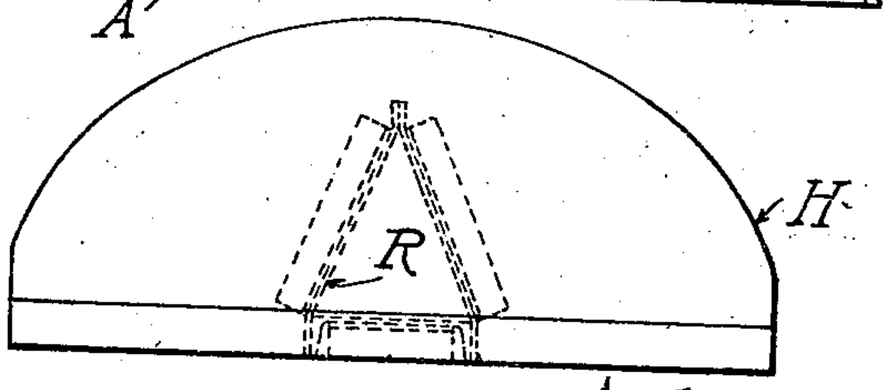


Fig. 13.

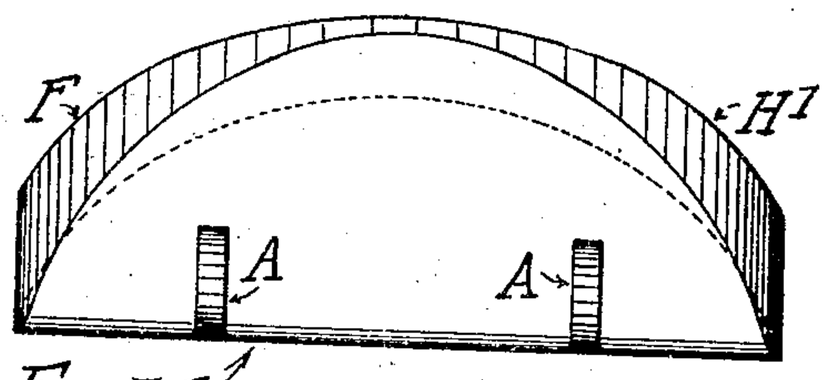


Fig. 14.

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UNITED STATES PATENT OFFICE.

ALEXANDER E. BROWN, OF CLEVELAND, OHIO, ASSIGNOR TO THE BROWN HOISTING MACHINERY COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF DELAWARE.

LEVELER FOR COKE-OVENS.

952,558. Specification of Letters Patent. Patented Mar. 22, 1910.

Application filed April 11, 1908. Serial No. 426,614.

To all whom it may concern:

Be it known that I, ALEXANDER E. BROWN, a citizen of the United States, residing in the city of Cleveland and county of Cuyahoga, in the State of Ohio, have invented a new and useful Leveler for Coke-Ovens, of which the following is a full, clear, and exact description.

My said invention belongs to the general class of apparatus or appliances by which the charge, as roughly dumped into coke-ovens, is leveled or spread therein to a uniform depth. Its use is more especially adapted to the Belgian or rectangular shaped ovens where the charge, as delivered through the trundle-heads, falls in a conical pile, throughout the dome portion of the oven, with its base conforming, of course, to the lower part of the same. In order to insure a uniform burning in the coking process to follow, it is necessary to reduce this pile to an even depth and evenly trim the same in its final place on the floor. This has generally been accomplished by repeatedly oscillating, longitudinally of the mass to be spread, an open-work bar or arm, provided with a series of hoe-blades extending downwardly between the sides. From the nature of the construction employed there will be pushed and massed within and to the front or discharge end of the kiln an undue quantity of the charge, and also, there will be left undisturbed, along the arch shaped section of the walls, a considerable portion of the charge that the rectangular section of the arm can not reach. Hence it is always necessary, in existing devices, so far as I know them, to supplement the mechanical operation above referred to by hand labor in order to obtain a complete leveling of the charge in every respect, which involves, of course, an undesirable cost of time and money for the operation.

It is the purpose of my present invention to provide a leveler, in this connection, constructed on a principle and according to a rule that will enable the desired degree of level to be obtained, as to charges, and, with but one stroke, forward and back, and that also will require no after-trimming by hand.

The device by which I accomplish the above object is fully illustrated by the drawings in the several figures which accompany and form a part of this specification, and, which I shall now proceed to more particularly explain.

Figure 1 is a side-view of a leveler, of the type in question, with its ram extended through a charge to its full limit. Figs. 2, 3 and 4, are respectively, sectional views of an oven with said ram in four several operative positions therein. Fig. 5 is a side elevation of a leveling head in place on the fixed arms of the ram. Fig. 6 is a front view of the same. Fig. 7 is a plan view thereof. Fig. 8 is a side view of a form of supporting arms for a head with a special method of adjusting the head of the ram indicated by the saw-tooth line. Fig. 9 is a front view of the supporting arms shown in the last figure. Fig. 10 is a side view of a head when open, and adjusted to a lowered position. Fig. 11 is a plan view of Fig. 8. Fig. 12 is a second special form of head. Fig. 13 is a front view of Fig. 12, and, Fig. 14 is a front view of the head, proper, shown in Fig. 10 with dotted lines to indicate its normal position.

L is the leveler-apparatus as a whole, which comprises in the drawings, a framework C, supported by trucks T, and carrying a ram R, that is mounted across said framework on guide-tracks within the box girder or hollow frame C. The girder C is open at its approach or oven end, and the trucks T are mounted and adapted to be traversed on the coke-pusher track before the ovens in modern plants—by a motor M, (carried by the leveler) which usually takes its current from the third-rail above the ovens.

O indicates the ovens, P the top contour of a charge as dumped; P′, shows the relative position of pile or charge, and a hinged ram-head when the latter has penetrated half-through the same when moving in the direction of the arrow; P^2 when the latter is at the full forward stroke of the ram; P^3 when at the half-backward stroke; and P^4 when near the finish.

The ram or arm proper is provided with rollers *r r*, upon which it is oscillated forward and back through the ovens, by rack and pinion, or any other suitable method. The ram may be either a single rigid arm or bar, or, as indicated in the drawings, may be of the telescopic type, and arranged to have its component members reciprocated, as in one of the forms of coke-pushers shown

and described in United States Letters Patent Number 644053, granted to me February 27, 1900.

Figs. 12 and 13 illustrate the method of equipping the front end of a leveler arm according, perhaps, to the broadest form of my invention. Said end is made to slope inwardly, and at a predetermined angle to receive and serve as a fixed bearing for a segment shaped steel head II that, substantially, occupies a transverse section of the oven. This head is of the width of the oven opening, and, otherwise, substantially conforms, in contour, to the same. The angle, at which it is to be fixed against the ram R will be determined largely by experiment, taking into consideration the particular slope that will best serve to allow all of the coal, in excess of the precise quantum required to spread the front or discharge end of the oven, to escape and flow backward behind the head as the latter is propelled forward. This adjustment must also take into the calculation the fact that all of the coal that thus flows behind, with such portion of the charge as is not advanced at all, by the forward stroke of the ram, but simply falls irregularly toward the floor, on that movement, must together be equal to the quantum of the charge required to spread and uniformly cover the back or entrance end of the oven. The head H must, further, extend above the ram-arm to such a height, in barb-like section, as will retain against overflow, and draw backwardly the quantum of coal needed for the last named purpose. In this manner, as is evident, the forward stroke will exactly fill and spread the forward half of the kiln, and its return will correspondingly fill and spread the back-end of the same, but one oscillation of the ram being required for the operation.

Figs. 5 to 14 (except Figs. 12 and 13) illustrate a form of head, adapted for use when the kiln openings are of short altitude or the charge is heavier, than when the form first above described is best applicable. In such conditions a fixed head, like the head H, that is proportioned to accomplish the leveling at one reciprocation, can usually be inserted through the oven doors, with difficulty if at all, and, it is therefore necessary to provide this second form of head for the conditions just referred to. In order to meet these conditions I provide a head H′, adapted, when normal, to occupy a sloping relation to the front end of the ram R, determined as, and upon the same considerations as H. This degree of slope must not be less than will bring the section of the head, when projected, to the dimensions required to propel substantially, the precise amount of the charge to the forward end of the oven that will completely level that portion. The head H′ however, instead of being rigidly fastened against the end of the ram R, is hinged thereto, or rather, to the supporting parallel arms A A, that project therefrom (Fig. 11). Stops S S, against any movement of the head H′ beyond the vertical, are provided at the extremities of these arms. By this arrangement, as is manifest when the head enters the door and is forced through the charge as dumped within, it will on both occasions automatically assume a position, in bearing against the ram R, as shown in Fig. 5, and, in dotted lines in Fig. 14, and when the ram is withdrawn, said head, being resisted by the charge, will revolve on its pivot, to a vertical, and occupy an increased area section of the oven (as shown in the full lines of Fig. 14) that has been calculated, as stated, to suffice to carry back the quantum of the charge required to complete the leveling. Figs. 2, 3 and 4 well show this operation, and, that, by reason of said calculation, and the open projecting arms to which the head H′ is pivoted, the last portion of said quantum, being drawn backwardly toward the entrance door, will fall, between the arms from behind said head, and allow the latter to resume its normal or lowest position, in bearing against the ram, so that it can be withdrawn through the opening. As a further precaution, against back-flow of the coal, around the sides of the head H, when in its vertical position, I add thereto the inward flange or rim-piece F, that joins and surrounds the edge of the same, at right angles to its projecting plane, and parallel to the ram R, when said head is in its normal position with respect thereto. To provide for a vertical adjustment of the head H′, to correspond with variations in the size of the charge to be leveled, I show in Figs. 8, 9 and 10, a special mode of effecting such adjustment by which indentations or sawteeth *s s* are fitted to the inner ends of the arms A A, to engage and mesh with similar indentations *s′ s′* upon the end of the ram.

The vertical adjustment, itself, when the fixed head H is used, may, preferably, be accomplished by means of a special jack-screw arrangement, comprising a vertical screw revoluble in fixed relation to the ram R and the frame-work C, by means of a suitable head gear, the ram and frame-work being slidably connected to fixed screw-heads specially provided for the purpose.

Having thus described my said invention and its mode of operation, what I claim, and desire to secure by Letters Patent, is:—

1. In an apparatus for leveling charges in coke ovens, the combination, with a reciprocating ram, or spreader-bar, of a pivoted or hinged head, crosswise thereof, and extending backwardly, as a single piece, in a sloping and barb-like section, the full

width of the oven, together with a suitable means of stopping the forward movement of said head on its pivot or hinges beyond a vertical with respect to the ram or bar, substantially as shown and described.

2. In an apparatus for leveling charges in coke-ovens, the combination with a reciprocating arm or spreader-bar, of a barb-like head or face, hinged or pivoted across the end thereof, provided with an inward rim or flange, substantially as shown and described.

Cleveland, Ohio, March 27 1908.

ALEXANDER E. BROWN.

In the presence of—
L. P. LIPPS,
CHARLES T. BUTT.