Feb. 6, 1923. 1,444,206.

R. C. PENFIELD.

APPARATUS FOR UNLOADING KILNS BY HOPPER, LIFTING DEVICE, OR THE LIKE.

FILED MAY 26, 1920. 2 SHEETS—SHEET 1.

Fig. 1.

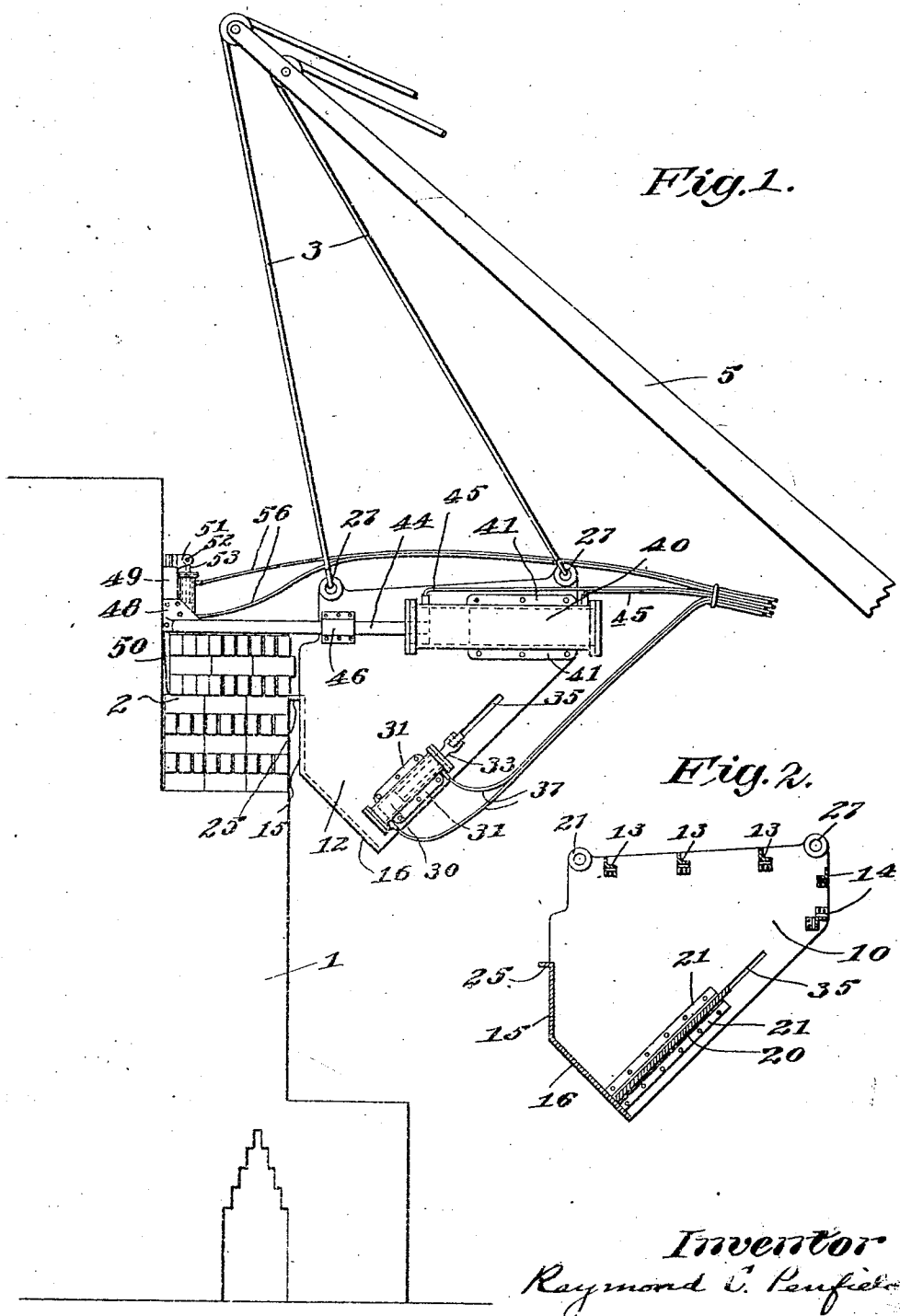


Fig. 2.

Inventor
Raymond C. Penfield
by James R. Hodder
Attorney

Feb. 6, 1923. 1,444,206.

R. C. PENFIELD.

APPARATUS FOR UNLOADING KILNS BY HOPPER, LIFTING DEVICE, OR THE LIKE.

FILED MAY 26, 1920. 2 SHEETS—SHEET 2.

Fig. 5.

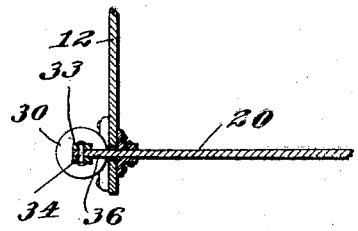


Fig. 3.

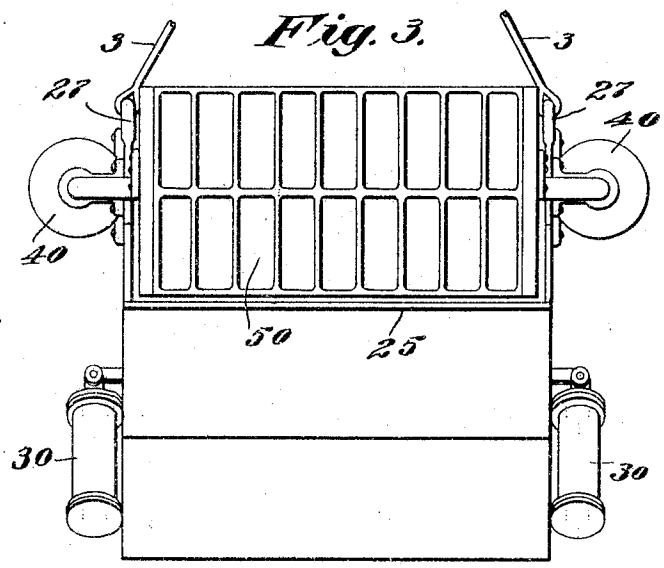


Fig. 4.

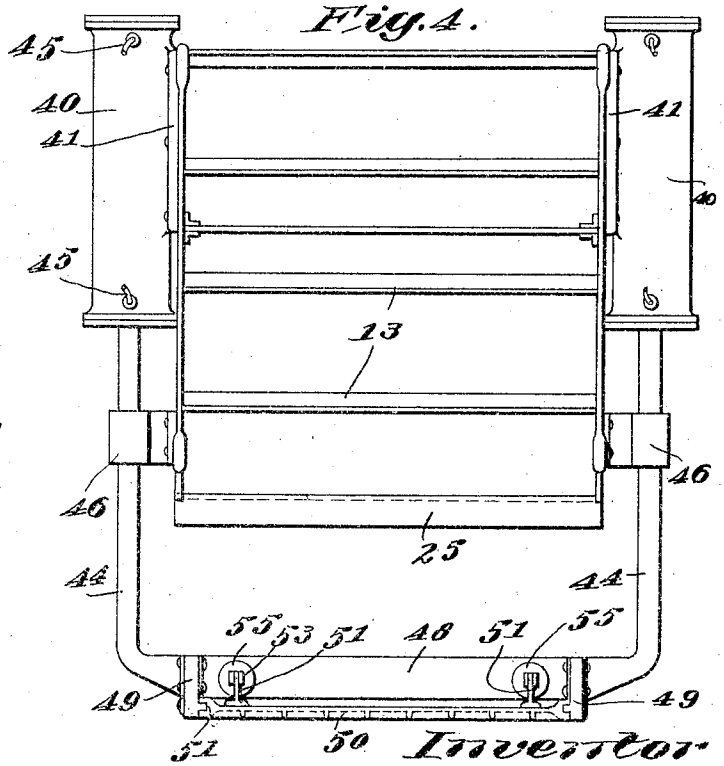
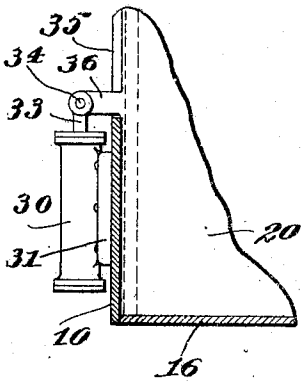


Fig. 6.



Inventor
Raymond C. Penfield

By James R. Hodder
Attorney

BEST AVAILABLE COPY

Patented Feb. 6, 1923. 1,444,206

UNITED STATES PATENT OFFICE.

RAYMOND C. PENFIELD, OF NEW YORK, N. Y.

APPARATUS FOR UNLOADING KILNS BY HOPPER, LIFTING DEVICE, OR THE LIKE.

Application filed May 26, 1920. Serial No. 384,285.

To all whom it may concern:

Be it known that I, RAYMOND C. PENFIELD, a citizen of the United States, and resident of New York, in the county of New York and State of New York, have invented an Improvement in Apparatus for Unloading Kilns by Hopper, Lifting Devices, or the like, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My present invention is a novel form of mechanical brick unloading apparatus, and this application is directed to cover and protect the mechanism and its equivalent forms, shown and described in my application on method and apparatus for mechanically removing brick from kilns, Ser. No. 383,571, filed May 22, 1920.

As explained in my said prior application, the method therein disclosed, consists in the employment of mechanical apparatus for engaging a plurality of brick in a layer, or in a plurality of layers, and sliding the same by power actuated devices, onto or into a carrier, which latter is lifted, conveyed or moved to a suitable delivery point;—or in thus engaging and similarly removing a mass of brick from the kiln onto a continuously moving carrier, apparatus for the latter purpose being illustrated in my copending application, Ser. No. 385,636, filed June, 1920. Present application is directed to the hopper, carrier or the like lifting device in combination with the brick engaging and removing instrumentalities.

Refering to the drawings, illustrating a preferred embodiment of the invention, and as shown in my said prior application,

Fig. 1 is a diagrammatic view of a brick removing and carrying lifter or hopper, shown in position against the face of a brick kiln, together with supporting means illustrated in fragmentary form;

Fig. 2 is a detailed view of the interior of one side of the carrier or hopper;

Fig. 3 is a front view;

Fig. 4 is a plan view; and

Figs. 5 and 6 are fragmentary detail views of the carrying apparatus.

As illustrated in the drawings, my mechanical brick removing apparatus is adapted to be positioned against the face of a brick kiln or stack, indicated generally at 1, the brick being delineated substantially in detail, showing a brick unit 2 in hacked relation substantially as originally set in the kiln and of the usual size when a mechanical brick-setter is employed in building up a kiln originally. This unit of brick comprises the usual plurality of rows set crosswise alternately.

The brick lifting and carrying device, which I have designated as a hopper, is adapted to be supported from any suitable overhead crane, carriage or the like, being here shown as suspended by a plurality of flexible cables 3, 3, swung over a beam 5, which latter may be carried by a portable revolving crane, of the type illustrated in the copending application Frafton E. Lube Ser. No. 449,241, filed March 2, 1921. Such a portable and revolving crane can be readily moved from point to point in the kiln, and the height and position of the hopper quickly and accurately determined in alinement with the face of the kiln and with any predetermined row or number of rows of brick which are to be mechanically separated from the kiln and moved into the hopper for subsequent transportation. Also the hopper can be thus readily forced against the face of the kiln and inclined somewhat by proper movement of the beam 5 or cables 3, 3, after it is in contact with the kiln, thus securing a substantial pressure against the kiln, as will be explained.

I prefer to utilize power actuated devices so that the entire action of positioning the carrier or hopper against the kiln, the separation of the courses and number to be moved into the hopper, and the actual movement or pulling of the courses of brick into the hopper, are all performed automatically and preferably from a single source of control on the crane. Furthermore, I also prefer to utilize power actuated means for unloading the hopper, after it is full and has been swung over to or moved at the desired point of discharge for the hopper load, as over a truck, car, boat or other transporting means. In the preferred enibodiment herein illustrated, I have shown pneumatic means for the power actuation of the hopper devices, but it will, of course, be understood that any suitable power can be employed, such as steam, electric motors or otherwise.

The hopper itself comprises a pair of sides 10 and 12, united at the topmost part by angle beams 13, 13, 13, at the back by braces 14, 14, and at the forward portion by plates

BEST AVAILABLE COPY

15 and 16, a sliding bottom consisting in the movable gate 20 being preferably employed, which latter slides between guideways 21 and 22, affixed to the inner sides of each of the side plates 10 and 12. I prefer also to form the bottom portion of the hopper inclined, as shown in the plate 16 and sliding gate 20, thus facilitating the removal of the brick by gravity upon the raising of the gate 20. At the forward and uppermost end of the front plate 15, is a flange 25, adapted to rest against the face of the kiln and constituting a lip or plate over which the rows of brick to be transferred from the kiln to the hopper will slide. This flange also takes up the pressure or thrust of the entire hopper against the kiln, and determines the lowermost course of brick which are to be moved into the kiln. By having the gate 20 also inclined, I may have the same elevated a short distance and thus control the chuting or dumping of the brick when discharging from the hopper. Suitable eyes or rings 27, 27, are formed in the side plates 10 and 12, to receive the supporting cables 3, 3, these being spaced and thus providing a four point suspension. To operate the gate 20, I provide pneumatic cylinders 30, 30, on the outside of the side plates 10 and 12, being attached to said side plates by flanges 31, 31, and with the piston 33 pivoted at 34 to a projecting lug 36, which is attached to the gate 20, said lug traversing a slot 35 in the side plates. With these pistons 30 at each side, and operated simultaneously, the gate 50 will be actuated to open or close at will, upon proper manipulation of the pneumatic force through the conduits 37, 37, which preferably extend to the point of control on the crane.

In order to effect the mechanical separation and removal of the brick from the kiln to the hopper, I provide power actuated reciprocating arms or a framelike device, being adapted to extend over the topmost row of the brick to be removed and thereupon to have a brick engaging wedge-like member extend downwardly, back of the desired plurality of rows of brick—preferably of a width substantially equal to that of the hopper, and thereupon draw the arms or frame backwardly, simultaneously drawing the brick engaged by the wedge into the hopper over the flange 25. After such a loading action, the hopper can be moved laterally and the loading action repeated, or can be lowered for a desired distance and the predetermined number of rows being removed at a time, again engaged and drawn into the hopper, until the latter is full.

In order to effect this separation of the rows to be removed and the drawing of the same inwardly, I prepare a pair of pneumatic cylinders 40, 40, on each side of the hopper, which cylinders are attached to the outside of the side plates 10 and 12, respectively, by flanges 41, 41, bolted thereto. These cylinders contain a piston attached to a rod 44 and the reciprocation of the piston is controlled by a pair of conduits 45, 45, also leading to the one point of control. The rods 44 extend through guides 46, and extend a sufficient distance forwardly of the hopper to give, together with the stroke of the cylinders, a substantial reciprocating movement in advance of the flange 25. These arms are united at their outward or forward ends by a cross-bar 48, which cross-bar carries a pair of guides 49, 49, in which a vertically sliding wedgelike member 50, is adapted to slide, a tongue and groove connection therefor 51, 51, or other suitable means, being employed. In order to move this vertically sliding wedge 50, I attach thereto a pair of projecting lugs 51, 51, which are pivoted at 52, 52, to the piston rod 53, 53, of a pair of pneumatic cylinders 55, 55. The reciprocation of the piston in this cylinder is controlled by conduits 56, 56, also leading to the same point of control as the others.

The operation of the apparatus will be readily understood. The hopper having been swung into desired position, adjacent the uppermost tiers or courses of layers of brick, with the flange 25 near the lowermost layer or course of brick to be drawn into the hopper, and with the wedge member 50 in its uppermost position, which would carry the bottom part substantially flush with the lower portion of the rods 44, and cross-bar 48, the operator actuates the cylinders 40 to extend or push outwardly to the extreme forward limit. If desired this position of the arms and cross-bar can be made and utilized as a means for lowering and positioning the hopper on the brick to be removed. As herein shown, the apparatus is designed for removing a maximum of three courses at a time, but can, of course, be employed to remove one or two courses, depending upon the distance downwardly which the wedge 50 is moved. With the apparatus in position against the face of the kiln, and if desired, inclined somewhat, rocking about the flange 25 as a pivot, lifting the bottom portions of the device so that the brick will slide thereinto, rather than drop, the operator then actuates the cylinders 55, which act to force downwardly the wedge 50, compressing the spaced brick together somewhat, substantially as shown in the three top rows of Fig. 1. These cylinders can be controlled so that the wedge 50 will extend downwardly the depth of one course of brick, of two courses, or of three, as illustrated, and the capacity of similar appartus can be increased to as many courses as is deemed advisable. The desired number and courses of brick to be moved being thus sep-

BEST AVAILABLE COPY

arated from the rest of the kiln, thereupon the cylinders 40 are actuated to draw the rods 44 inwardly or backwardly, thus simultaneously moving, drawing and transferring the rows of brick engaged by the wedge 50 into the hopper. Thereupon the apparatus may be shifted laterally while maintained at the same height and with the flange 25 sliding in contact with the face of the kiln, the operator meanwhile having actuated the cylinders 55 to raise the wedge. When in the new position the cylinders 40 are then actuated to move the rods 44, cross-bar and wedge forwardly, into position for reactuation of the wedge 50 to separate and remove a successive plurality of brick.

It will also be appreciated that the control of the actuation of the cylinders 40 determines the number of brick horizontally to be moved, the distance which the rods 44 are moved, being at all times under control of the operator up to the limit of the stroke of the cylinders. Thus if desired, the rods 44, could be moved forwardly for the wedge 50 to separate three brick, six brick, or more, and at any point desired, the wedge 50 could be depressed, separating the brick between it and the hopper, which were subsequently moved therein.

Also the entire apparatus can be lowered from time to time, or raised, and a mass or load of brick thus mechanically separated from the kiln and moved into the hopper, which latter is then swung and lifted to desired point of discharge, the load released, by actuation of the gate hoppers 30, and the hopper then replaced for successive operation. It will also be appreciated that such a mechanical unloading apparatus can be relied upon to determine the exact number of brick thus transferred, the same being in a uniform setting in a kiln. The operator therefore knows exactly how many brick the hopper is transferring or delivering each time without other counting or checking of same.

My invention is further described and defined in the form of claims as follows:

1. Apparatus of the kind described, comprising a brick carrying hopper, adapted to be positioned adjacent a stack or brick, rods adapted to slide on said hopper and extend forwardly thereof over the stack of brick, means on the outer ends of said rods to separate a predetermined mass of brick from the stack and means to retract the rods and thereby slide the mass of brick thus separated into the hopper.

2. Apparatus of the kind described, comprising a brick carrying hopper, adapted to be positioned adjacent a stack of brick, rods adapted to slide on said hopper and extend forwardly thereof over the stack of brick, power actuated means on the outer ends of said rods to separate a predetermined mass of brick rows from the stack, and power actuated means to retract said arms and slide said brick into the hopper.

3. Apparatus of the kind described, comprising a brick carrying hopper, a pair of power cylinders on the sides of said hopper, rods adapted to be reciprocated by the action of said cylinders, a wedge shaped engaging device on the outer ends of said rods, and means to actuate said cylinders and wedge device whereby the carrier may be positioned adjacent a stack of brick, the rods extended forwardly, the wedge member moved downwardly and said rods retracted while the wedge member is in downward position, engaging and forcing a plurality of brick from the stack to the hopper.

In testimony whereof, I have signed my name to this specification.

RAYMOND C. PENFIELD.