

C. J. VAN DOREN.
CEMENT KILN CLEANING MACHINE.

APPLICATION FILED MAY 25, 1903.

4 SHEETS—SHEET 1.

NO MODEL.

Fig. 1.

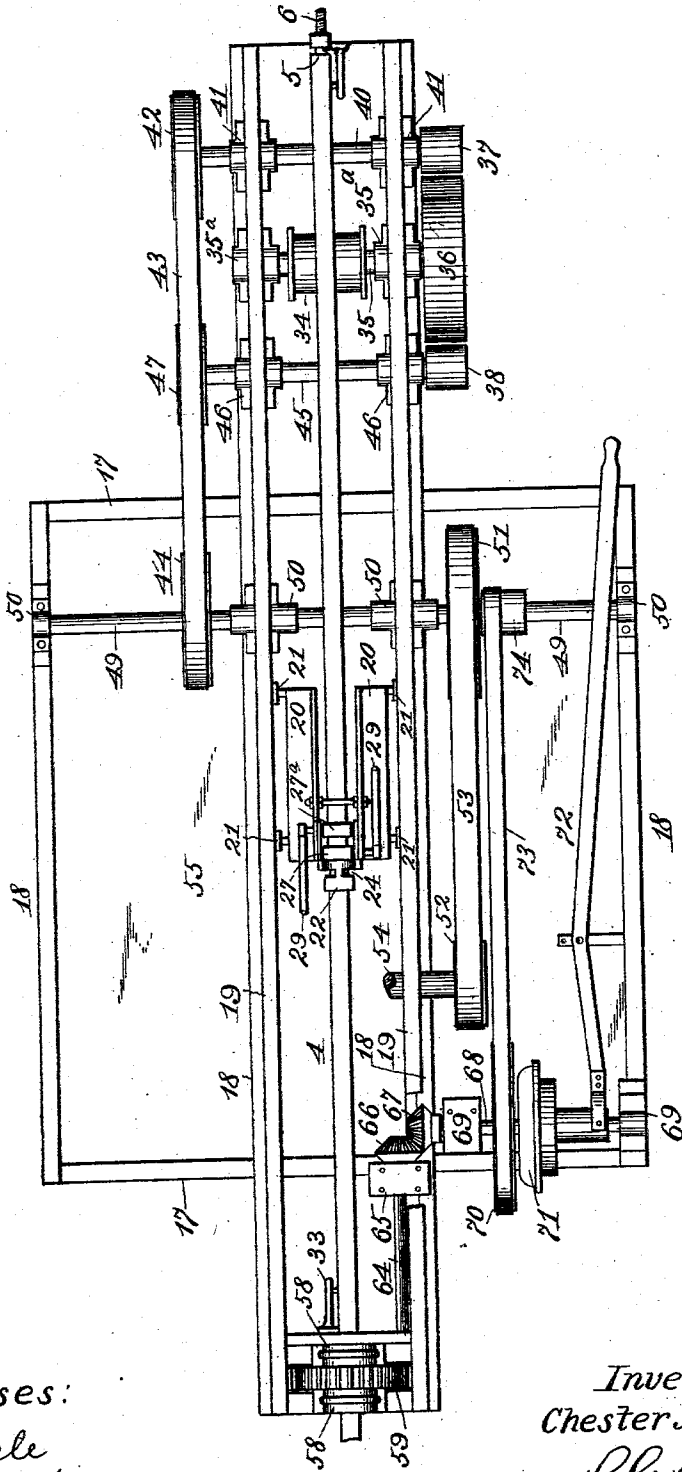
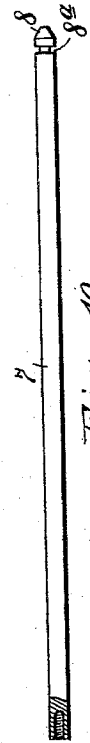


Fig. 10.



Witnesses:
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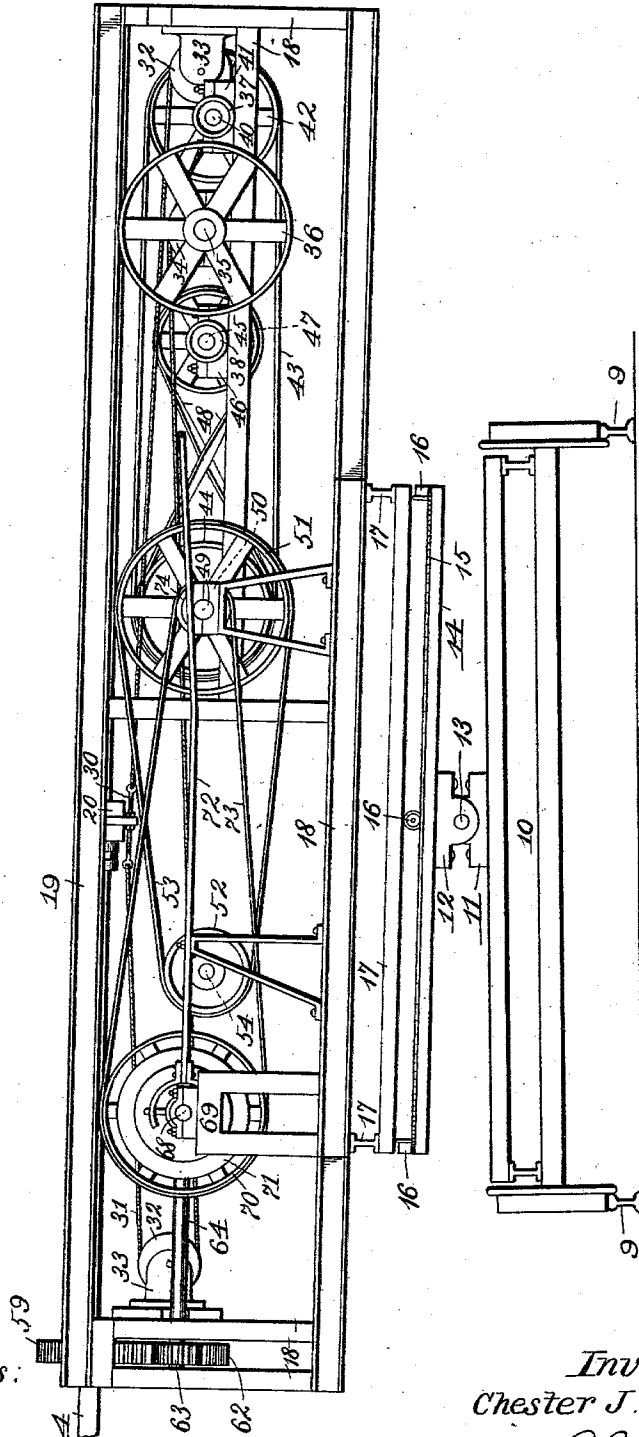
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

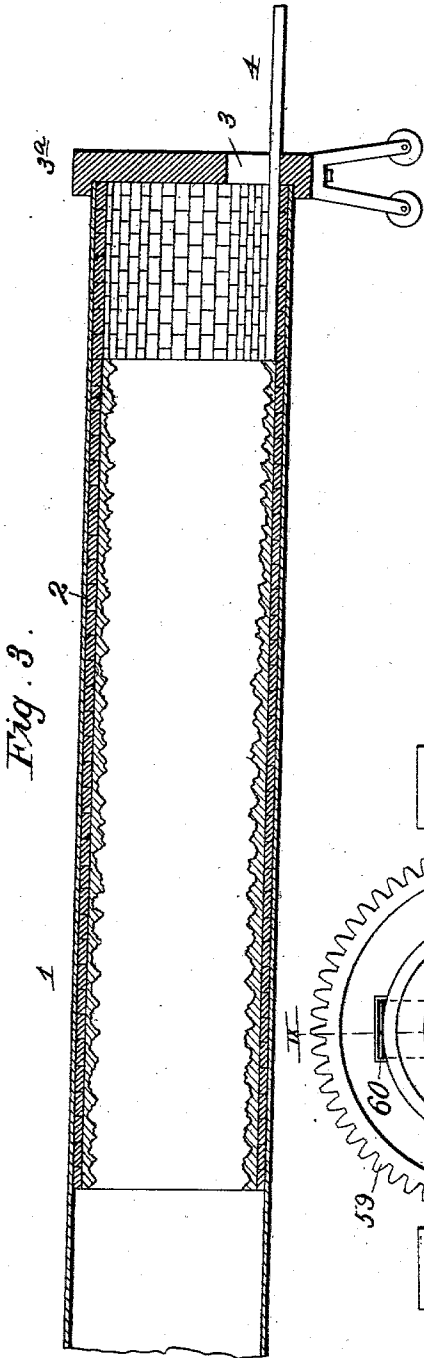


Fig. 3.

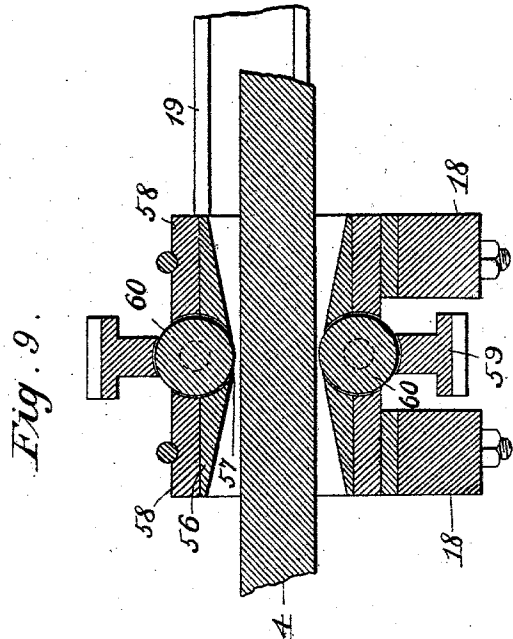


Fig. 9.

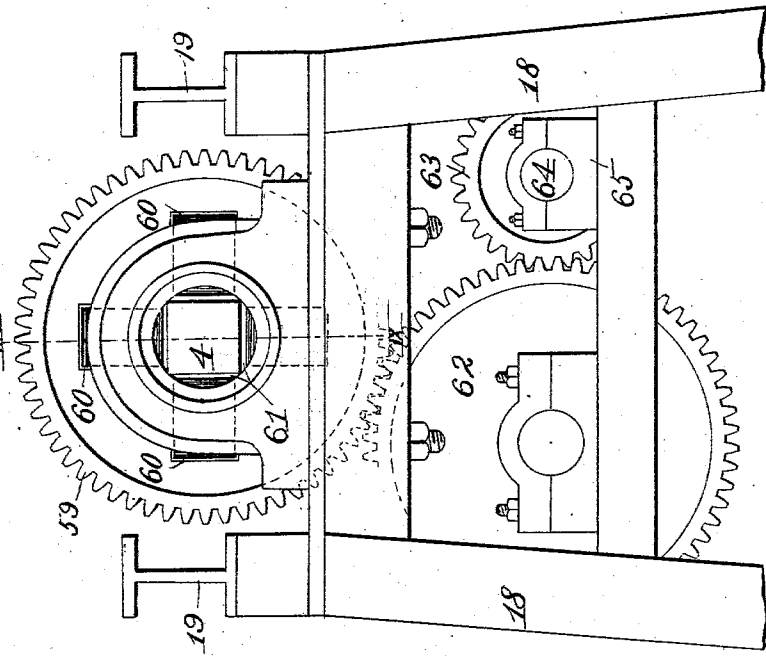


Fig. 8.

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4 SHEETS—SHEET 4.

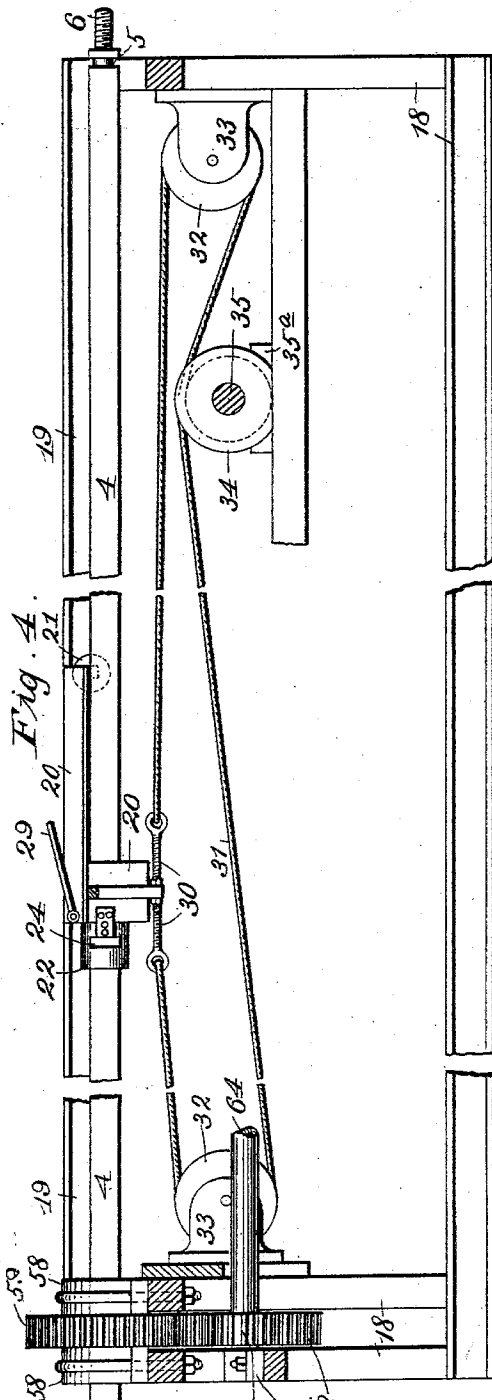


Fig. 4.

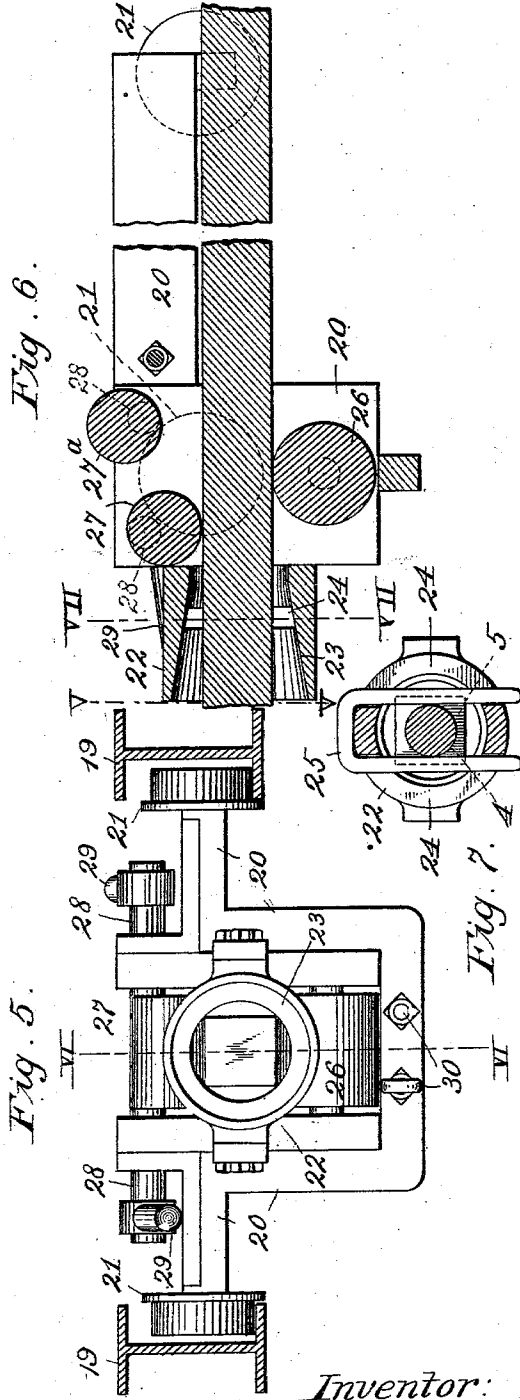


Fig. 5.

Fig. 6.

Fig. 7.

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Att'y.

UNITED STATES PATENT OFFICE.

CHESTER J. VAN DOREN, OF IOLA, KANSAS.

CEMENT-KILN-CLEANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 757,522, dated April 19, 1904.

Application filed May 25, 1903. Serial No. 158,677. (No model.)

To all whom it may concern:

Be it known that I, CHESTER J. VAN DOREN, a citizen of the United States, residing at Iola, in the county of Allen and State of Kansas, have invented certain new and useful Improvements in Cement-Kiln-Cleaning Machines, of which the following is a specification.

My invention relates to a cement-kiln-cleaning machine; and my object is to provide an effective machine whereby the arduous manual labor heretofore required to perform this work is reduced to a minimum.

The two essential features of the invention consist in a rotary head for rotating a cleaning-bar and a carriage for reciprocating said cleaning-bar. These two elements are connected in such a way that they may be operated either simultaneously or independently.

The more important of the minor features resides in a mounting for the frame carrying the rotary head and the carriage, whereby universal movement is applied to said frame in order that the cleaning-bar may be readily brought into contact with its work.

Although I do not claim any part of a cement-kiln or the arrangement of kilns in cement-works, the following brief description will assist others in more thoroughly understanding my invention.

In cement-works the kilns, which are cylinders rotatably mounted and about sixty feet long, are usually arranged in two rows, with a gangway between, varying from fifteen to twenty feet in width. In the center of this gangway and extending longitudinally therewith I locate a track for the operation of a truck provided with a platform having universal movement, upon which I mount my machine in order that it may be readily brought opposite any of the kilns requiring cleaning. The instrument inserted in the kiln to remove the incrustation therefrom consists of a bar which for convenience in handling is made in sections shorter than the kiln, so that as the cleaning operation progresses from the front toward the rear of the kiln one or more lengths may be added to complete said cleaning operation.

Referring now to the drawings, which illus-

trate my invention, Figure 1 represents a plan view of the machine. Fig. 2 is a side elevation of the same in position for operation. Fig. 3 is a reduced continuation of Fig. 2, showing the cleaning-bar inserted in a kiln. Fig. 4 is an enlarged vertical section of the frame and the carriage employed for reciprocating the cleaning-bar. Fig. 5 is an enlarged front elevation of the carriage with its track in section. Fig. 6 is a vertical section of the same, taken on line VI VI of Fig. 5. Fig. 7 is a cross-section of the front end of the carriage and the cleaning-bar located therein, taken on line VII VII of Fig. 6. Fig. 8 is a broken front elevation of the machine, showing the revolving head forming one of the essential features of the invention. Fig. 9 is a vertical section of the revolving head and its bearing, taken on line IX IX of Fig. 8. Fig. 10 is a detail of an extension-bar adapted to be secured to the cleaning-bar.

In the drawings, 1 designates a broken longitudinal sectional view of one of the rotary kilns set on a slight incline and having its interior lined about one-half its length with fire-brick 2 and provided with an opening 3 in a stationary head 3^a, through which a cleaning-bar 4 forming part of the invention, is inserted. Said cleaning-bar is provided at its rear portion with a circular groove 5 and a reduced threaded terminal 6 for the reception of an extension-bar 7, having a tapering rear end 8 and a circular groove 8^a.

9 designates a track arranged in the gangway between the kilns (not shown) to receive a wheeled truck 10, provided with a central bearing 11, to which a similar bearing 12 is pivotally connected at 13 and supports a platform 14, having a circular track 15 to receive rollers 16, carrying a turn-table 17, upon which the machine-frame 18 is rigidly mounted, with its center of gravity arranged perpendicular to pivot 13, so the turn-table and machine-frame may be readily tipped to accommodate the cleaning-bar to the pitch of the kiln. The upper portion of frame 18 is provided with a longitudinal track composed of a pair of I-beams 19 to receive a traveling carriage consisting of a frame 20, mounted upon four track-rollers 21, and a cylindrical head 22,

the interior of which flares outwardly at 23 and is provided with slots 24 to receive a loosely-fitting U-bolt 25. The forward portion of the carriage is provided at its under side with a roller 26, and a pair of eccentric cams 27 27^a, having integral trunnions 28, are journaled in the frame of the carriage above the cams and provided with operating-handles 29.

10 The lower portion of the carriage-frame is also provided with a pair of oppositely-extending eyebolts 30, to which are attached the opposite ends of a cable 31, that passes around two sheave-wheels 32, located in line with the
15 eyebolts and journaled in brackets 33, secured to the front and rear ends of the machine-frame. After passing around sheave-wheels 32 the cable is wound around the periphery of a drum 34, rigidly mounted upon a shaft
20 35, journaled in bearings 35^a and provided at one end with a large rigidly-mounted friction-wheel 36, adapted to be driven in opposite directions by small friction-wheels 37 38, bearings 35^a being adjustably mounted in the well-
25 known manner, so they may be shifted by a lever (not shown) in order to throw the large friction-wheel 36 into contact with either of the small friction-wheels.

Friction-wheel 37 is rigidly mounted upon
30 one end of a transverse shaft 40, journaled in bearings 41 and provided at its opposite end with a large drive-pulley 42, driven by an endless belt 43, connecting it to a rigidly-mounted pulley 44.

35 Friction-wheel 38 is rigidly mounted upon one end of a shaft 45, journaled in bearings 46 and provided at its opposite end with a pulley 47, which is preferably of smaller size than pulley 42 and is driven in a reverse direction to the latter by an endless cross-belt 48,
40 operating over pulley 44 and beneath belt 43.

Pulley 44 is rigidly mounted upon a transverse shaft 49, journaled in bearings 50 and provided near its opposite end with a large
45 rigidly-mounted pulley 51, which in turn is driven by a smaller pulley 52 with a connecting-belt 53. Pulley 52 is mounted upon a shaft 54, driven by a suitable motor (not shown) carried upon platform 55 of the machine.

50 The rotating head of the machine consists of a cylinder 56, the interior of which flares outwardly in opposite directions from a central point 57 for a purpose hereinafter described. Said cylinder is journaled at the
55 front end of the machine in bearings 58 and provided with a rigidly-mounted centrally-disposed cog-gear 59 and four diametrically-disposed rollers 60, the adjacent peripheries of which are arranged to form a hollow square 61 for the reception of the cleaning-bar, which is rectangular in cross-section and loosely fits in said hollow square, but is rotated with the cylinder by the rollers 60 contacting with its corners.

65 Cog-gear 59 is driven by a train of gearing

consisting of an intermediate gear 62, a pinion 63, rigidly mounted upon one end of a shaft 64, journaled in bearings 65 and provided at its opposite end with a bevel-gear 66, driven by an intermeshing bevel-gear 67, rigidly mounted upon one end of a shaft 68, journaled in bearings 69. Shaft 68 is also provided with a loosely-mounted pulley 70 and a friction-clutch 71, adapted to be thrown into engagement with the loose pulley by a lever
75 72 for the purpose of locking said pulley upon the shaft in the well-known manner.

Pulley 70 is driven by an endless belt 73, operating over a small pulley 74, rigidly mounted upon shaft 49.

80 The following is a brief description of one way of operating my machine: The machine is positioned with its rotary head opposite opening 3 in the kiln. The carriage is then run back to the rear end of its track, and the
85 rear portion of the cleaning-bar is locked in position on the carriage by the cams 27 27^a and roller 26, while the forward end of the cleaning-bar extends through the rotary head. As the lower portions of the cams incline toward each other, it is obvious that as the carriage moves forward cam 27^a will bind tightly upon the cleaning-bar and cause it to move forward with the carriage, and when the latter moves toward the rear end of the machine
95 cam 27 will bind against the cleaning-bar and cause it to move back with the carriage. Thus by reciprocating the carriage the forward portion of the cleaning-bar may be caused to strike successive blows against the incrustation on the fire-brick. After the more prominent portions of the incrustations have been thus broken away very effective work may be accomplished by rotating the cleaning-bar by means of the rotary head so its square
100 corners will grind away the incrustation. The work is also greatly facilitated at times by imparting both a reciprocating motion and a rotary motion to the cleaning-bar, which is accomplished by disengaging the cams from
105 the cleaning-bar and securing the grooved end of the latter to the slotted head 22 by U-bolt 25.

The ease with which the frame can be moved in any direction makes it possible for the operator to readily direct the end of the cleaning-bar against any portion of the incrustation.

115 After the cleaning operation has progressed as far as the cleaning-bar will reach extension-bar 7 is attached to threaded portion 6 in order that the cleaning-bar may complete the
120 removal of the incrustation from the fire-brick.

Very good work may also be accomplished by releasing the cleaning-bar and its extension from the carriage and running the latter back out of the way, so the bar may be
125 grasped and employed as a lever for breaking the incrustation by using point 57 as a fulcrum.

When it is desired to again secure the cleaning-bar and its extension upon the carriage, the tapered end 7 is readily guided between
130

the cams 27 27^a and the roller 26 by the flaring opening in head 22.

I do not limit myself to the specific construction shown and described, as the carriage, for instance, might be propelled by a screw, or it could be made self-propelling by providing it with a motor, which could be geared to rollers 21, or the rollers could be dispensed with and runners substituted therefor, so it would slide upon the track. The rotary head could also be modified and driven by a more simple arrangement of gearing than shown without departing from the spirit and scope of the appended claims.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a kiln-cleaning machine, a rotary head for rotating the cleaning-bar.
2. In a kiln-cleaning machine, a carriage for reciprocating the cleaning-bar, and a frame having universal movement, the carriage being operatively mounted upon said frame.
3. In a kiln-cleaning machine, a rotary head for rotating the cleaning-bar, and a frame having universal movement, the rotary head being operatively mounted upon said frame.
4. In a kiln-cleaning machine, a carriage, a rotary head, and means for operating the carriage and the head either simultaneously or independently.
5. In a kiln-cleaning machine, a cleaning-

bar, a carriage for operating the same, consisting of a suitable frame, a roller mounted in the frame, and cams adapted to hold the cleaning-bar in contact with the roller.

6. In a kiln-cleaning machine, a cleaning-bar, a carriage for operating the same, consisting of a suitable frame, a head secured to the frame, and suitable means for securing the cleaning-bar to said head.

7. In a kiln-cleaning machine, a cleaning-bar, a carriage for operating the same, consisting of a suitable frame, a slotted head secured to the frame and the interior of which flares outwardly toward one end, and suitable means for securing the cleaning-bar to the slotted portion of said head.

8. In a kiln-cleaning machine, a rotary head suitably mounted and consisting of a cylinder, open at its opposite ends, and rollers suitably arranged in said cylinder.

9. In a kiln-cleaning machine, a rotary head suitably mounted and consisting of a cylinder, the interior of which flares outwardly toward its opposite ends from a central point, and rollers arranged at said central point to form a hollow square.

In testimony whereof I affix my signature in the presence of two witnesses.

CHESTER J. VAN DOREN.

Witnesses:

S. A. GARD,
J. E. STANLEY.