

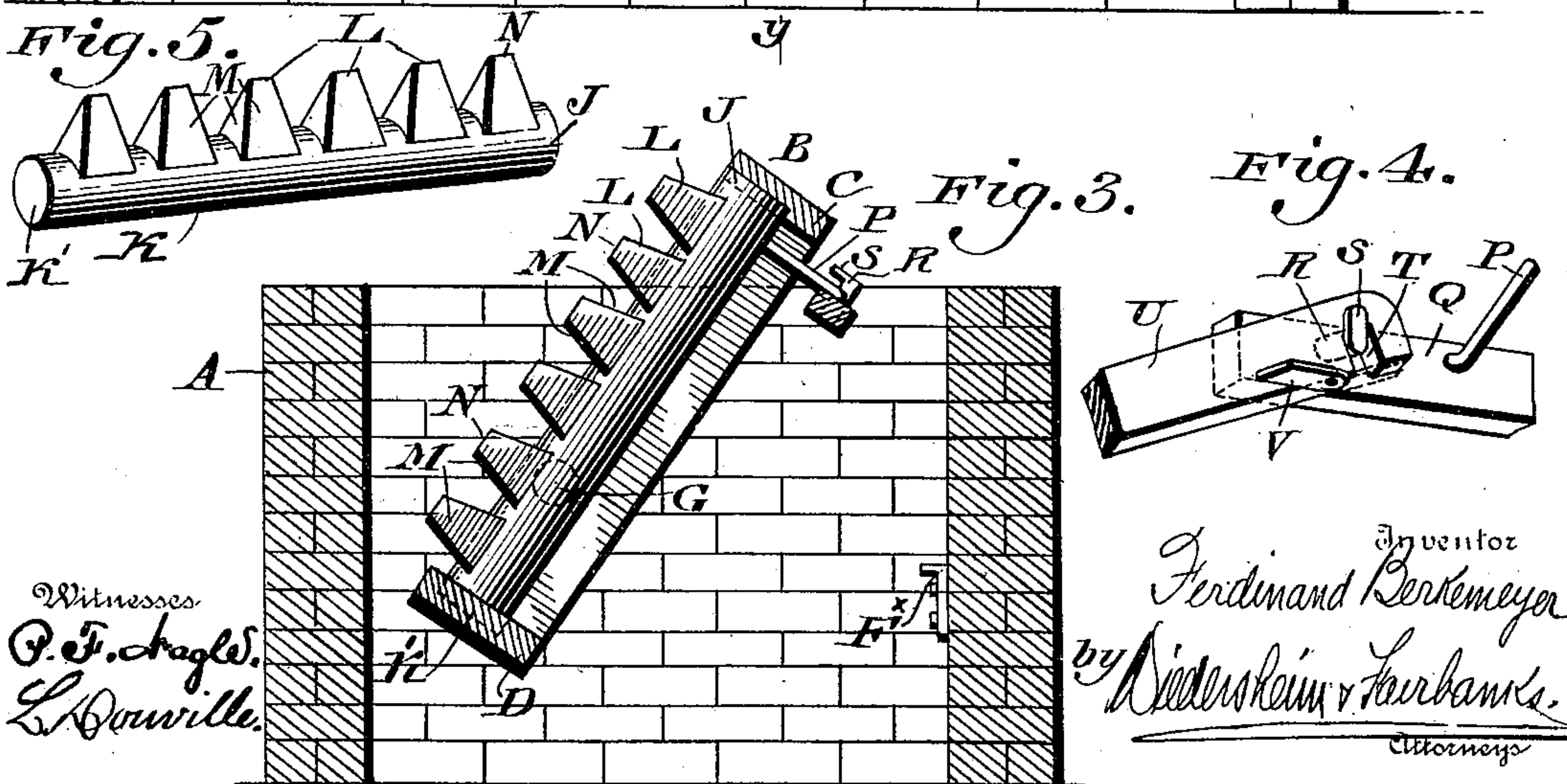
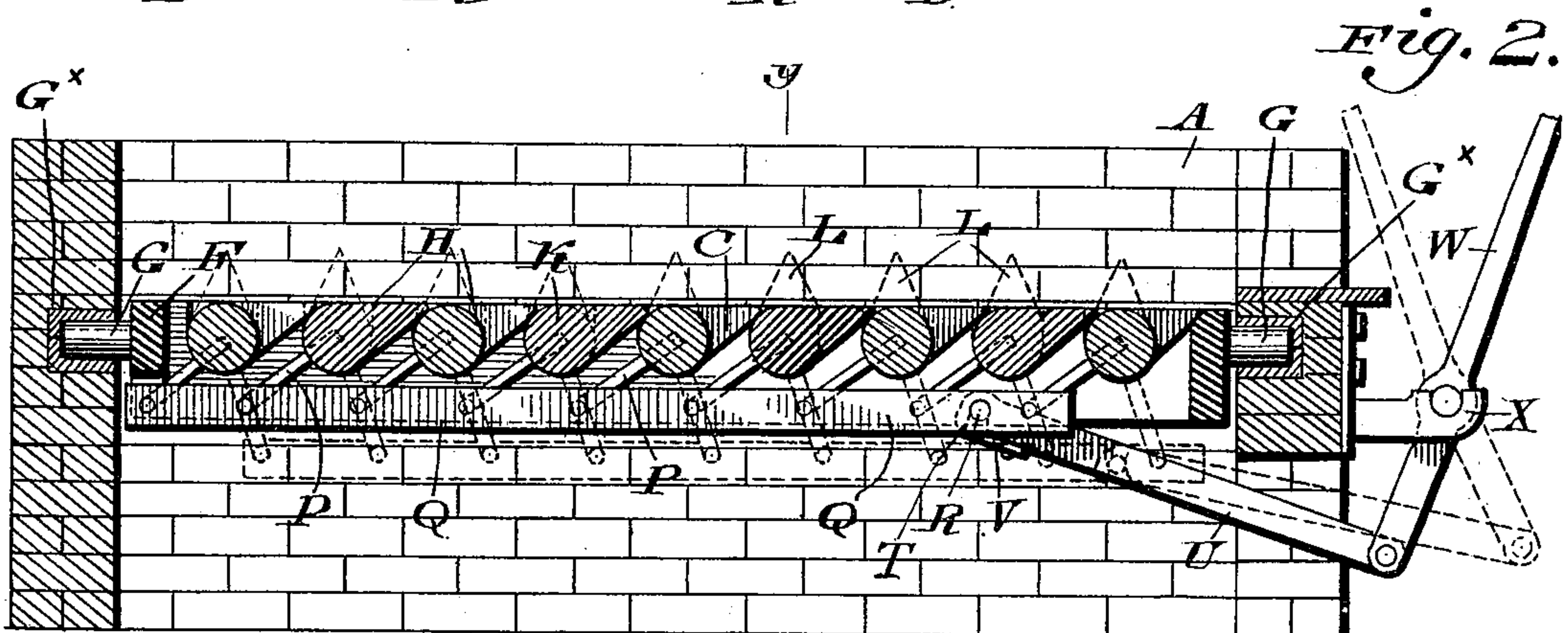
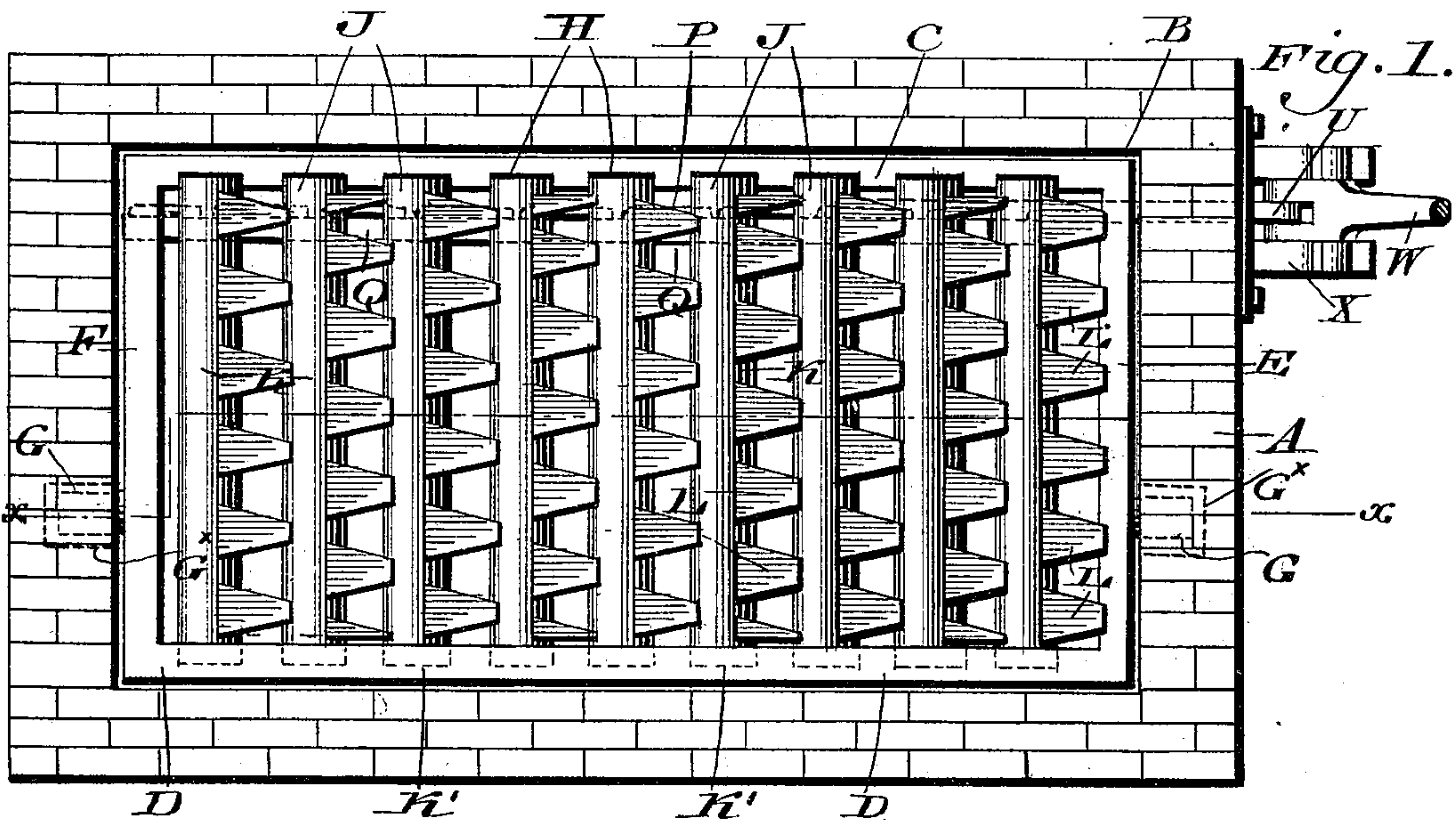
No. 626,136.

Patented May 30, 1899.

F. BERKEMEYER.
SHAKING GRATE.

(Application filed Aug. 5, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

FERDINAND BERKEMEYER, OF SELLERSVILLE, PENNSYLVANIA.

SHAKING-GRATE.

SPECIFICATION forming part of Letters Patent No. 626,136, dated May 30, 1899.

Application filed August 5, 1898. Serial No. 687,777. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND BERKEMEYER, a citizen of the United States, residing at Sellersville, in the county of Bucks, State of Pennsylvania, have invented a new and useful Improvement in Shaking-Grates, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to an improved construction of shaking-grate wherein I obtain a simple and economical grate over any of the structures now in use, the same consisting of a plurality of substantially cylindrical grate-bars having pyramidal teeth or fingers arranged in staggered order projecting therefrom, said teeth being normally adapted to lie in a substantially lateral or horizontal position, but when the grate is rocked to assume an upright position, thereby thoroughly raking the ashes without disturbing the fire, and thus properly agitating the entire surface of the latter, there being no dropping of coal or air-spaces or irregular draft, and the grate being adapted to all kinds of furnaces, boilers, or stoves of square, oval, rectangular, or other contour, while the actuating means being located below the grate in the ash-pit is not exposed to the fire and cannot readily get out of repair.

It also consists of an improved construction of grate-bar having a solid substantially cylindrical body and teeth or fingers arranged in alinement thereon, said teeth being of pyramidal shape and having a thickened base.

It further consists of novel details of construction, all as will be hereinafter fully set forth, and particularly pointed out in the claims.

Figure 1 represents a plan view of a shaking-grate embodying my invention. Fig. 2 represents a longitudinal section on line *x x*, Fig. 1. Fig. 3 represents a transverse section on line *y y*, Fig. 2. Fig. 4 represents a detached perspective view showing the manner of disconnecting the actuating-lever from the connecting-bar when it is desired to dump the grate-frame. Fig. 5 represents a perspective view of a single grate-bar in detached position.

Similar letters of reference indicate corresponding parts in the figures.

Referring to the drawings, A designates a furnace setting or casing, the same having located therein the grate-frame B, which may be rectangular, oval, cylindrical, or any other desired contour, the same being, however, shown in the present instance as rectangular.

The frame B consists of the side members C and D and the front and rear end members E and F, which are suitably connected together and provided with the journals or trunnions G, which rock in suitable bearings G^x, seated in the walls of the furnace, it being noted that said bearings and trunnions are located to one side of the line of the longitudinal axis of the grate-frame, so that the weight of the frame and the fuel on the latter will normally tend to cause said frame to remain in horizontal position, its motion being limited by the stop or bracket F^x, the position of the same being understood from Fig. 3, said bracket being omitted from the other figures for the sake of clearness of illustration.

H designates recesses which extend downwardly from the upper portion of the bars C, while the opposite bar B is provided with a socket, said recess and socket being adapted for the reception of the extremities J and K' of the grate-bars K, respectively.

The general construction of grate-bars K will be apparent from Fig. 5, the same consisting of a preferably solid cylindrical or substantially cylindrical body portion, which has projecting therefrom pyramidal teeth or fingers L, each of the latter having a thickened base, the inclined sides M, and the truncated top N, it being apparent that when the bars are in assembled position, as indicated in Fig. 1, the teeth L will be arranged in staggered order throughout the length of the grate, it being of course understood that the grate-bars seen at the left-hand portion of Figs. 1 and 2 are provided with fingers or teeth L, all arranged in staggered order, substantially as indicated at the right of Figs. 1 and 2. It will be seen on reference to Figs. 1 and 2 that the teeth of each bar overlap an adjacent bar when they are thrown to a horizontal position. In this way the ends of the fingers rest upon and are supported by said bar, and are thereby prevented from falling below the grate-surface, it being noted that when the ends of the fingers rest upon the bars their

upper faces serve to form the flat surface of the grate.

P designates links or arms projecting from the under side of the grate-bars K and pivotally connected to the actuating-bar Q, which latter has a pin R projecting therefrom which is provided with the upturned portion S, said pin being seated in the recess T of the link or lever U, whose outer extremity is pivotally attached to the lever W, which is fulcrumed in a suitable bracket X.

V designates a plate which is adapted to close the recess T, and thus prevent disengagement of the pin R therefrom.

The operation is as follows: The parts normally appear as seen in full lines at the right-hand portion of Fig. 2 and also Fig. 1, the upper portion of the fingers or teeth L extending in substantially a horizontal line, with their ends resting upon an adjacent bar K, so that an even and level grate surface or bed for the fuel is attained, since the upper or fuel-bearing sides of said teeth L are substantially tangential to the upper periphery of the grate-bars. When it is desired to shake the grate, the bar is actuated by means of the lever W and the intermediate connections, whereupon it will be seen that the teeth or fingers L will be oscillated or rocked and assume the position indicated in dotted lines in Fig. 2, and the fuel on the grate-bars will be thus agitated to the desired extent. When it is desired to dump the grate, the bar Q is disconnected from the link or lever U by moving the plate V into the position seen in Fig. 4, after which the link U can be readily disengaged from the pin R and the grate-frame B can be rocked on its trunnions G into the position indicated in Fig. 3, and thus dumped, it being apparent that by reason of the trunnions G being offset or removed to one side of the longitudinal axis of the grate-frame, and by reason of the location of the center of gravity of said frame and the weight of the fuel on the grate-bars said frame will always tend to remain in a substantially horizontal position and to rest upon the stop or bracket F^x.

It will be seen from the foregoing that by my invention the grate-bars are uniformly spaced apart transversely throughout the entire grate, so that only ashes drop into the ash-pit, while the rocking or oscillation of the grate-bars is uniform and can cause no air-spaces to disturb the even draft of the fire.

The teeth L rock backwardly and forwardly when the grate is shaken and serve in reality as so many poker. The actuating-bar, which connects the grate-bars, being located underneath the latter, in the ash-pit thereof, operates each of the rocking bars and is not exposed to the action of the fire.

The form of grate-bar and teeth is one of the chief and leading features of this invention, and it is due to their structure that what I term the "poker action" is attained when shaking the grate. It is seen that the grate-

bars are cylindrical and of one diameter throughout and that the teeth project from one side thereof only. They are also evenly disposed within the grate-frame, so that when rocked they retain practically the same relative position—that is to say, the spaces between the bars do not vary. This is due to their cylindrical contour, as is obvious, and is distinguished from the grates composed of flat bars and angular and flat teeth in that when the latter are tipped a considerable space is left between the adjacent bars and a stepped grate-surface is formed, as the teeth or wings extend on both sides of the bar, and thus when the bar is rocked one set of teeth of a bar rises and the other set falls. This has the effect of disturbing the bed of coals, due to the raised and depressed or stepped portions of the grate. With the present invention, however, the pyramidal teeth rise, while the other portions of the grate retain the same relative position, and hence the bed of coals is not disturbed further than it is subjected to the raking action due to the swinging of these teeth. This has the effect of loosening and removing the ashes only. It does not form enlarged spaces at either end or at any part of the grate and is similar in a great measure to the approved poker action. The bed formed by the grate is always flat throughout, and when the teeth are again brought to a horizontal position their upper faces lie flush with the upper face of the grate by reason of their pyramidal contour and tangential sides and the fact that they project in one direction and on one side only of the grate. Furthermore, when in their normal position said teeth lie practically below the surface of the grate or below the upper sides of grate-bars and are consequently below the bed of coals and will not readily burn out.

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

1. A grate consisting of a plurality of rocking grate-bars having teeth projecting from one side only thereof the outer ends of said teeth being adapted to be supported by an adjacent grate-bar.

2. A grate consisting of a plurality of rocking grate-bars having teeth projecting from one side only thereof, said teeth being tapered on their sides and the outer ends of said teeth being adapted to be supported by an adjacent grate-bar.

3. A grate consisting of a plurality of rocking grate-bars having teeth projecting from one side only thereof, said teeth being tapered toward their outer ends and with their side faces approximately tangential to the periphery of said grate-bars the outer ends of said teeth being adapted to be supported by an adjacent grate-bar.

4. A grate consisting of a plurality of rocking grate-bars having teeth projecting from one side only thereof, said teeth having their side and end faces tapered or converging to-

ward their outer ends the outer ends thereof being adapted to be supported by an adjacent grate-bar.

5 5. A grate consisting of a plurality of cylindrical rocking grate-bars having teeth projecting from one side only thereof, the end and side faces of said teeth being tapered or converging toward their outer ends, and said side faces being approximately tangential to
10 the periphery of said grate-bars the outer ends of said teeth being adapted to be supported by an adjacent grate-bar.

15 6. In a shaking-grate, a grate-frame, composed of side and end members, one of said sides being recessed to allow the extremity of the grate-bars to drop vertically thereinto, the other of said sides being provided with a bearing for the end of the grate-bar seated

therein, a plurality of grate-bars seated in said frame, said grate-bars having fingers or 20 teeth projecting from one side only thereof arranged in staggered order longitudinally throughout the grate, the outer ends of said teeth being adapted to be supported by an adjacent grate-bar and means for oscillating 25 said bars.

7. A grate consisting of a plurality of rocking grate-bars having teeth projecting from one side only thereof, the ends of said teeth overlapping and contacting with an adjacent 30 grate-bar when the teeth are moved to a horizontal position.

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