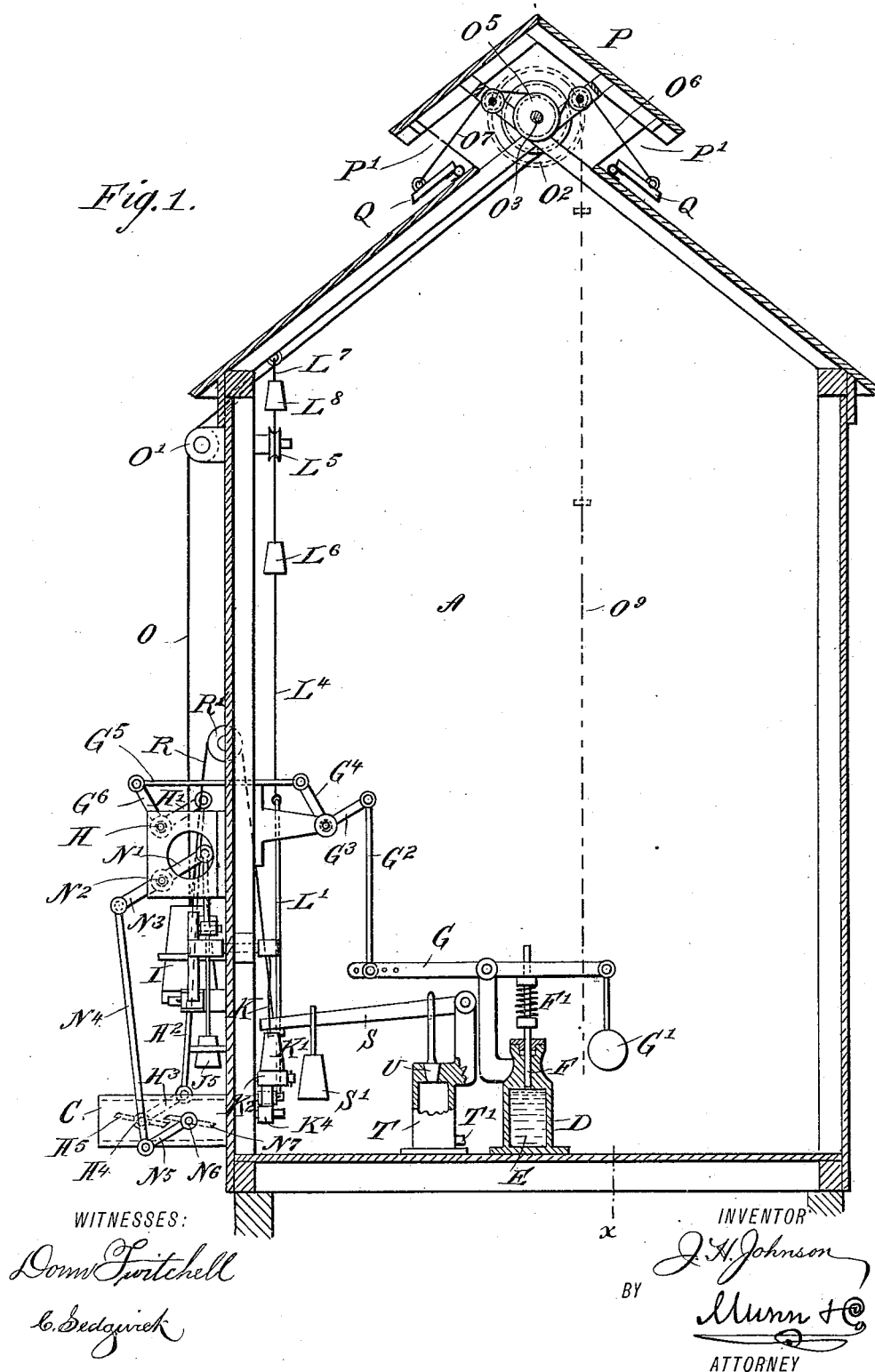


J. H. JOHNSON.
KILN.

No. 419,334.

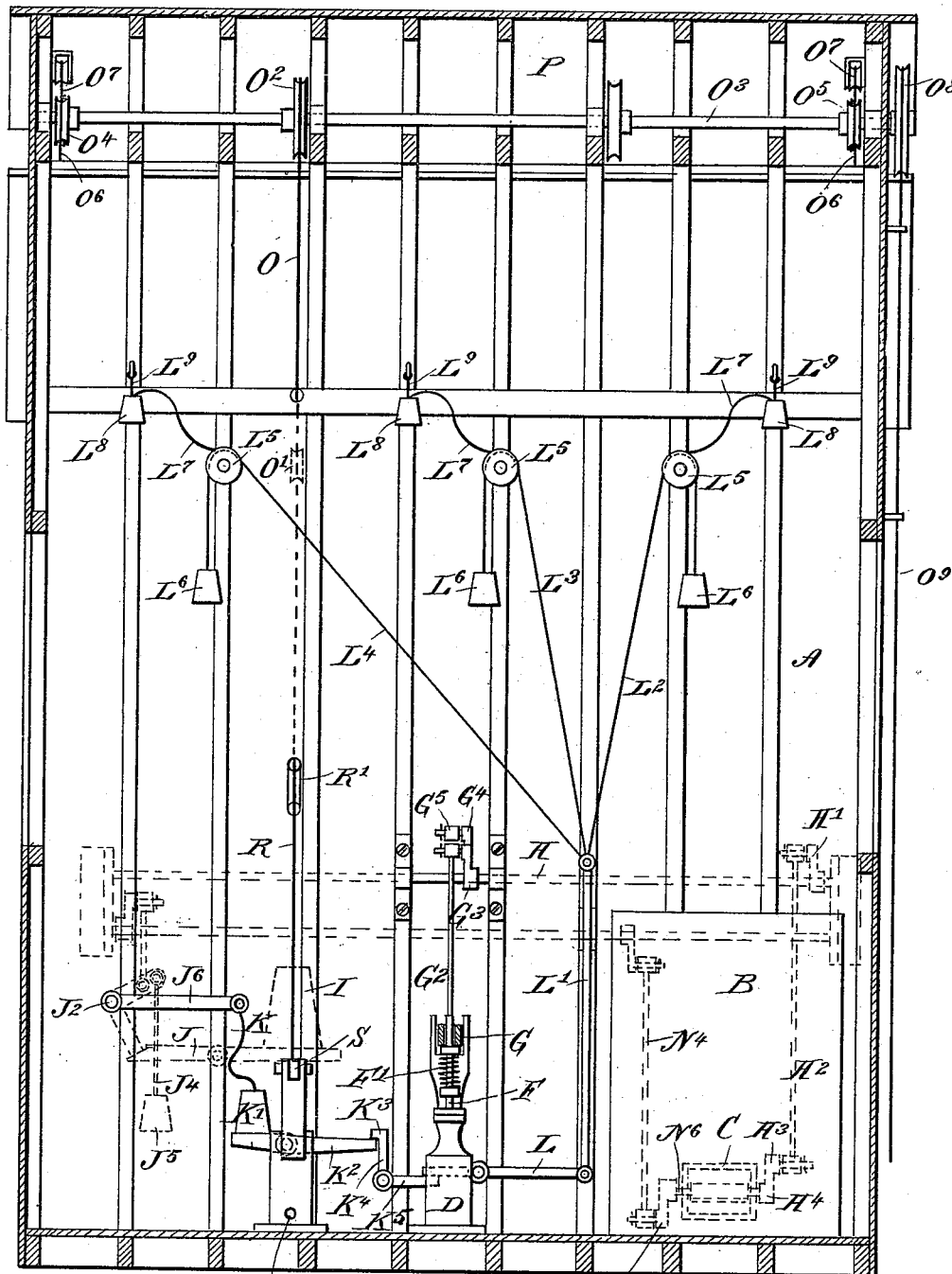
Patented Jan. 14, 1890.



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KILN.

No. 419,334.

Fig. 2. Patented Jan. 14, 1890.



WITNESSES:

Down Twitchell
C. Sedgwick

INVENTOR

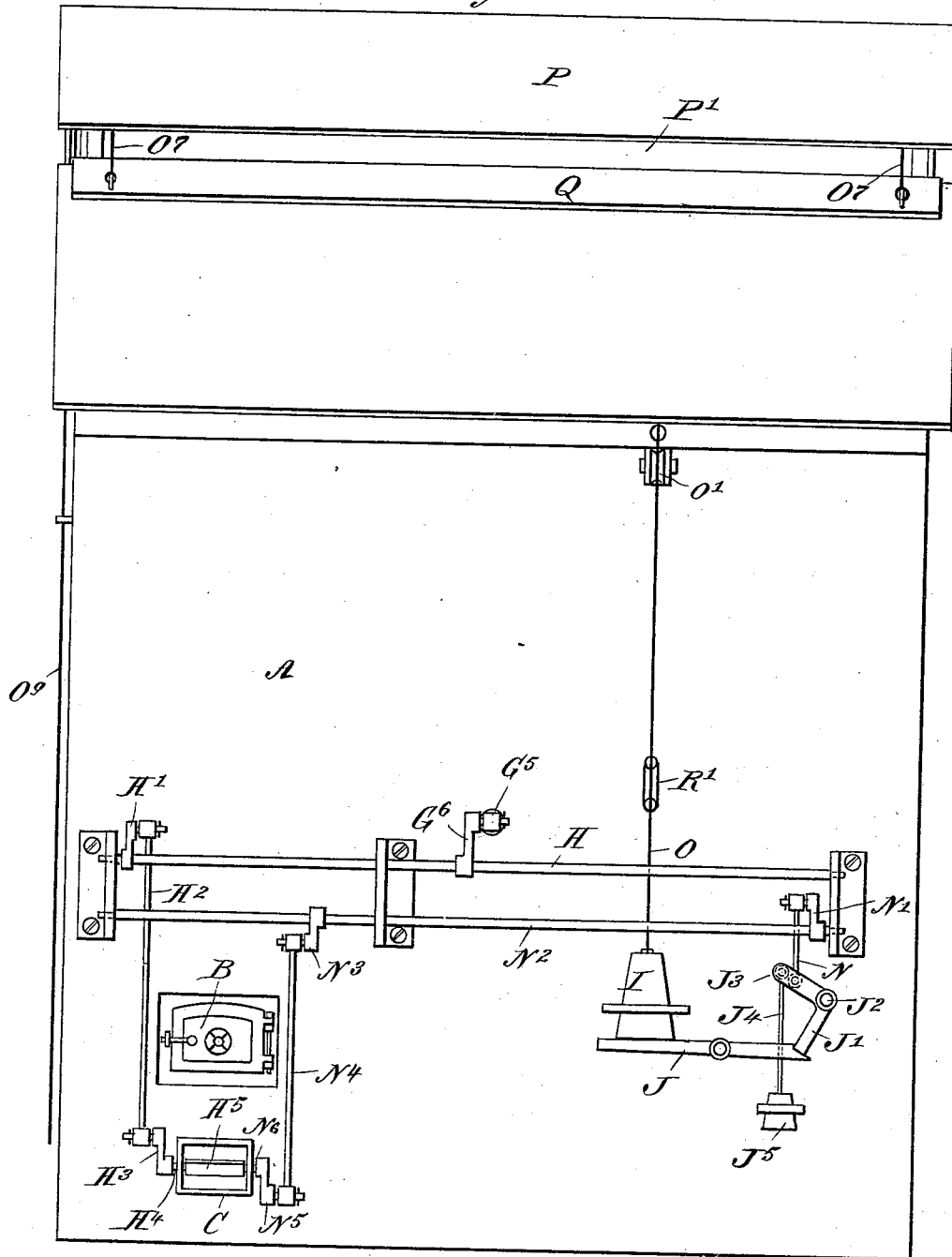
J. H. Johnson
BY
Munn & Co.
ATTORNEY

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Fig. 3.



WITNESSES:

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INVENTOR

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UNITED STATES PATENT OFFICE.

JOHN H. JOHNSON, OF ORANGE, TEXAS.

KILN.

SPECIFICATION forming part of Letters Patent No. 419,334, dated January 14, 1890.

Application filed April 19, 1889. Serial No. 307,722. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. JOHNSON, of Orange, in the county of Orange and State of Texas, have invented certain new and useful
5 Improvements in Kilns, of which the following is a full, clear, and exact description.

The invention relates to heat-regulators for dry-kilns; and its object is to provide new and improved means for extinguishing acci-
10 dental fires occurring within the kilns.

The invention consists of certain parts and details and combinations of the same, as will be hereinafter described, and then pointed out in the claims.

15 Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional end elevation of a
20 kiln-building to which my invention is applied. Fig. 2 is a longitudinal sectional elevation of the same on the line *x x* of Fig. 1, and Fig. 3 is a side elevation of the improve-
ment.

25 In the drawings I show an automatic heat-regulating apparatus, which I propose to use together with the fire-extinguisher, and for which I also propose to file a separate application. I will first describe such heat-regu-
30 lating apparatus, so that its relation to the invention herein claimed may be understood. The kiln-building A, of suitable size and construction, contains a furnace B of any approved construction and provided with an
35 air-inlet pipe C, extending to the outside of the building A. Inside of the latter is located a vessel D, containing mercury or other suitable substance easily expanded by heat. In the top of the vessel D is held to slide a pis-
40 ton F, resting at its interior end on the top of the mercury E in the vessel D, so that when the mercury expands the piston F is moved upward. Near the upper end of the piston F is held a spring F', on the top of
45 which rests one end of a lever G, fulcrumed on a suitable bracket secured to the vessel D. On one end of the lever G is hung a weight G' for holding the piston F in a lowermost position—that is, in contact with the top of
50 the mercury E. The other end of the lever G is pivotally connected by a link G² with an

arm G³ of a bell-crank lever pivoted inside of the building A on one of its walls and connected by its other arm G⁴ with a link G⁵, which extends horizontally to the outside 55 through a suitable slot in one of the walls of the kiln. The outer end of the link G⁵ is pivotally connected with an arm G⁶, secured on a shaft H, extending longitudinally and mounted in suitable bearings secured to the 60 outside of the kiln A. On the shaft H is also secured an arm H', pivotally connected by a link H² with a crank-arm H³, fastened on the outer end of a shaft H⁴, extending transversely through the air-inlet pipe C and carrying a 65 damper H⁵, located inside of the said pipe C. When the heat in the kiln A exceeds a normal degree, then the mercury E in the vessel D is expanded to such an extent that the piston F in moving up raises the weighted end of 70 the lever G and causes a downward movement of the other end of the lever connected with the arm G³ of the bell-crank lever, which is connected by the arms G⁴ and G⁶ and the link G⁵ with the shaft H. The latter is con- 75 sequently turned, so that the arm H' swings downward and causes a turning of the shaft H⁴ by the link H² and the crank-arm H³. The turning of the shaft H⁴ closes the damper H⁵ in the pipe C, so that the air from the out- 80 side is prevented from passing into the furnace B. When the heat in the building A decreases to the normal degree, then the lever G is returned to its former position by the weight G', and the damper H⁵ is moved 85 in an opposite direction to its former position by the means above described in connection with the said lever G. The air is then again permitted to pass into the furnace B and through the same, to be heated and discharged 90 into the building A. The spring F', on which the lever G rests, eases the sliding movement of the piston F.

I will now describe the fire-extinguishing apparatus. On the outside of the building 95 A is arranged a weight I, resting on one end of a lever J, fulcrumed on the outside of the building A. The other end of the said lever J is locked in place by a trigger J', secured on a shaft J², mounted to turn in suitable bear- 100 ings in the wall of the building A and extending transversely to the inside of the same.

On the shaft J² on its outside is secured an arm J³, from which hangs downward a rope J⁴, supporting a weight J⁵. The weight J⁵ is considerably lighter than the weight I, so that the latter holds the trigger J' locked on the lever J. On the inner end of the shaft J² is secured an arm J⁶, to the free end of which is secured a slack rope K, connected with a weight K', resting on one end of a lever K², fulcrumed in the building and locked in place at its other end by a hook K³, formed on the arm K⁴ of a bell-crank lever, also fulcrumed in the building next below the lever K². The other end of the arm K⁴ is engaged by one end of a lever L, also fulcrumed on the wall of the building and pivotally connected at its other end with an upwardly-extending link L', to which are secured the ends of a number of ropes L², L³, and L⁴, diverging upward over the side wall and passing over suitable pulleys L⁵, as is plainly shown in Figs. 1 and 2. The ropes L², L³, and L⁴, after passing over the pulleys L⁵, each carry a weight L⁶, so as to hold the lever L in contact with the lever K⁴, whereby the latter is locked in place. From each of the ropes L², L³, and L⁴, hangs loosely a rope L⁷, connected with a weight L⁸, supported by a rope L⁹ from a hook in the roof of the building A. The weighted arm J³, secured on the outer end of the shaft J², is pivotally connected by a link N with the crank-arm N', secured on the shaft N², extending longitudinally on the outside of the building A and mounted in the same bearings that carry the shaft H, before mentioned. On the shaft N² is also secured a crank-arm N³, pivotally connected by a link N⁴ with a crank-arm N⁵, secured on a shaft N⁶, extending transversely through the air-pipe C and located in the rear of the damper H⁵, before mentioned. The shaft N⁶ carries a damper N⁷, similar in construction to the damper H⁵, and serving to close the air-pipe C in case of an accidental fire in the building A. The weight I, resting on the lever J, is connected with a wire rope O, extending upward and passing over a pulley O', located under the roof of the building A. The wire rope O then passes into the building A and upward under the said roof and winds onto a drum O², secured on a shaft O³, extending longitudinally and mounted to rotate in suitable bearings formed in the dome P, supported on top of the roof. The dome P is provided on each side with a longitudinal opening P', so that excessive heat in the building A can pass through the said openings P' to the outside. On the shaft O³ near each end are secured the pulleys O⁴ and O⁵, over each of which pass the two ropes or chains O⁶ and O⁷, extending in opposite directions through the openings P' and connecting with the dampers Q, pivoted on the top of the roof on the outside and adapted to close the longitudinal openings P' in the dome P. On one end of the shaft O³ is secured a pulley O⁸, on which winds one end of a rope O⁹, hanging downward on the out-

side of the kiln A and serving to open or close the dampers Q from the ground whenever desired. The weight I is also connected with one end of a rope R, extending upward and passing over the pulley R' to the inside of the building A. The inner end of the rope R is connected with the free end of a lever S, carrying a weight S' and fulcrumed on a bracket secured to a steam-receptacle T, into which opens a steam-pipe T', connected with a boiler or other suitable source of steam-supply. The steam-vessel T is closed at its upper end by a valve U, opening upward and hung on the lever S, before mentioned.

The operation is as follows: When the heat in the kiln-building A is normal, the dampers H⁵ and N⁷ in the furnace B are open. When the heat exceeds a normal degree, then the damper H⁵ is closed, as before described, by the expansion of the mercury E in the vessel D. The dampers Q can be opened and closed at any time from the outside by manipulating the rope O⁹ in the usual manner. When an accidental fire occurs in the kiln, one of the ropes L³, supporting the weight L⁸, is burned, so that the weight L⁸ drops downward and causes an upward pull on the respective rope or chain L², L³, or L⁴, whereby the link L' is moved upward and the lever L moves the arm K⁵ of the bell-crank lever downward, and the arm K⁴ swings sidewise, whereby the hook K³ is disengaged from the lever K². The weight K', resting on the latter, now drops, causing the arm J⁶ to swing downward. This motion of the arm J⁶ turns the shaft J², whereby the trigger J' is disengaged from the notched end of the lever J, and the latter is thus set free. The weight I is thus dropped and exerts a pull on the rope O, so that the shaft O³ in the dome P of the kiln A is turned, whereby the pulleys O⁴ and O⁵ wind up their respective ropes O⁶ and O⁷, so as to close the dampers Q. At the same time the weight I exerts a pull on the rope R, whereby the lever S is raised and the valve U is unseated from the steam-vessel T. The steam in the latter can now escape through the valve-seat into the building A, so as to extinguish the accidental fire. The turning of the shaft J² imparts a downward swinging motion to the arm J³, which, by its connection by means of the link N and the crank-arm N' with the shaft N², turns the latter, so that the damper N⁷ in the air-inlet pipe C is closed. Thus it will be seen that the access of air to the furnace B is shut off, the dampers Q in the top of the dome are closed, and the interior of the kiln is flooded with steam, so that the fire is quickly extinguished.

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

1. In a kiln, the combination, with weights suspended by ropes in the kiln-building, of ropes connected with the said weights, a link connected with the said ropes, a lever connecting at one end with the said link, a bell-

crank lever locked in place by the said lever, a second lever locked in place by the said bell-crank lever, and a weight resting on the said second lever and adapted to control a valve for admitting steam to the kiln, and also adapted to close the dampers in the dome of the kiln, substantially as shown and described.

2. The combination, with weights suspended by ropes in the kiln-building, of weighted ropes connected with the said weights, a link connected with the said ropes, a lever connected at one end with the said link, a bell-crank lever locked in place by the said lever, a second lever locked in place by the said bell-crank lever, a drop-weight resting on the said second lever, a pivoted arm connected with said weight by a rope, a rock-shaft operated by said arm, and mechanism connected with the rock-shaft for opening a steam-discharge valve, as shown and described.

3. The combination, with weights suspended by ropes in the kiln-building, of weighted ropes connected with the said weights, a link connected with the said ropes, a lever connected at one end with the said link, a bell crank lever locked in place by the said lever, a second lever locked in place by the said bell-crank lever, a drop-weight resting on the said second lever, an arm connected by a rope with the said weight, a rock-shaft to which said arm is attached, a weighted lever controlling a steam-outlet valve, and a rope for connecting such weighted lever and rock-shaft, as shown and described.

4. The combination, with weights suspended by ropes in the kiln-building, of weighted ropes connected with the said weights, a link connected with the said ropes, a lever connected at one end with the said link, a bell-crank lever locked in place by the

said lever, a second lever locked in place by the said bell-crank lever, a drop-weight resting on the said second lever, an arm connected by a rope with the said weight, a rock-shaft and its arm to which such rope is attached, a hinged damper in the dome of the kiln, and a rope connecting said damper with the rock-shaft, as shown and described.

5. The combination, with weights suspended by ropes in the kiln-building, of weighted ropes connected with the said weights, a link connected with the said ropes, a lever connected at one end with the said link, a bell-crank lever locked in place by the said lever, a second lever locked in place by the said bell-crank lever, a drop-weight resting on the said second lever, a rock-shaft and its arm connected by a rope with the said weight, hinged dampers in the dome of the kiln, ropes connecting the dampers and rock-shaft, and pulleys over which said ropes pass, some in opposite directions to others, so that the rotation of the rock-shaft will open or close said dampers, as specified.

6. The combination, with weights suspended by ropes in the kiln-building, of weighted ropes connected with the said weights, a link connected with the said ropes, a lever connected at one end with the said link, a bell-crank lever locked in place by the said lever, a second lever locked in place by the said bell-crank lever, a drop weight resting on the said second lever, a pivoted arm connected by a rope with the said weight, a steam-vessel located in the kiln-building and provided with an outlet-valve, and means, substantially as described, connecting the said valve with the said arm, as set forth.

JOHN H. JOHNSON.

Witnesses:

S. CHENAULT,
C. R. MOSS.