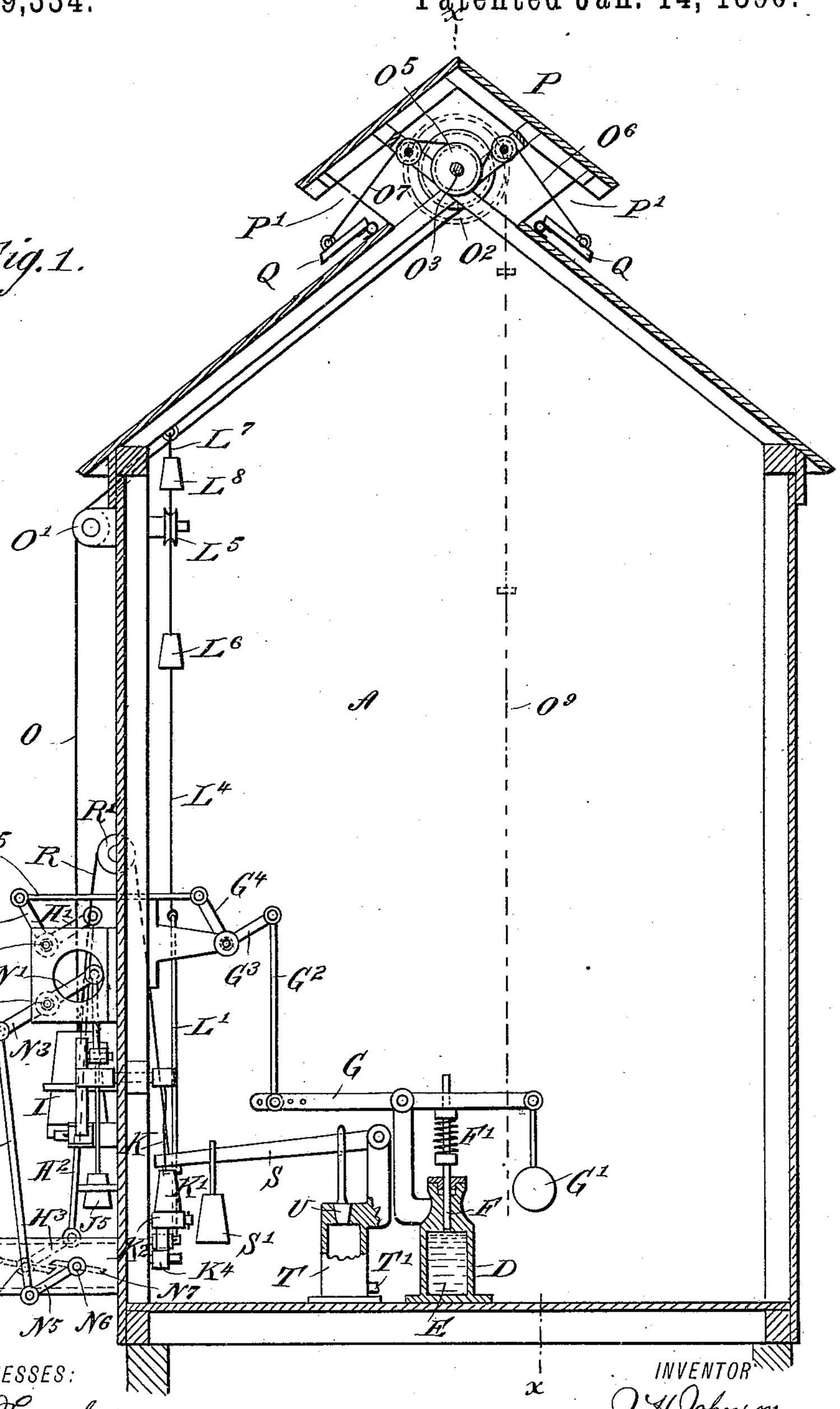
(No Model.) 3 Sheets—Sheet 1.

J. H. JOHNSON.

KILN.

No. 419,334. Patented Jan. 14, 1890.

Fig. 1.



WITNESSES:

Donn Fortchell

C. Sedgwick

INVENTOR

J. H. Johnson

BY

Munn & Co

ATTORNEY

(No Model.) 3 Sheets—Sheet 2.

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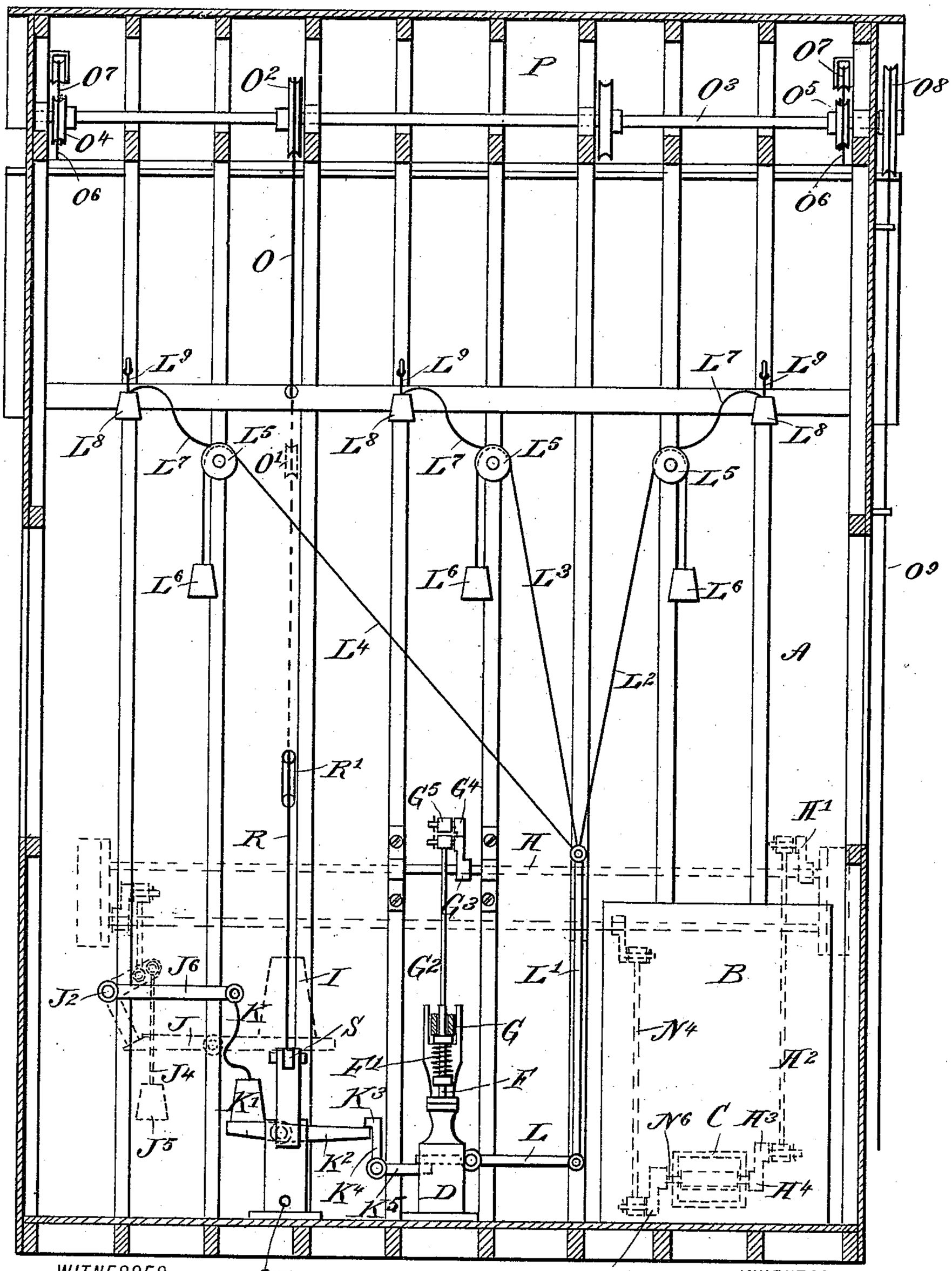
Fig. 2.



WITNESSES:

Donn Switchell

C. Sedgwick

INVENTOR

J. H. Johnson

BY

Munn & Co

ATTORNEY

(No Model.)

3 Sheets—Sheet 3.

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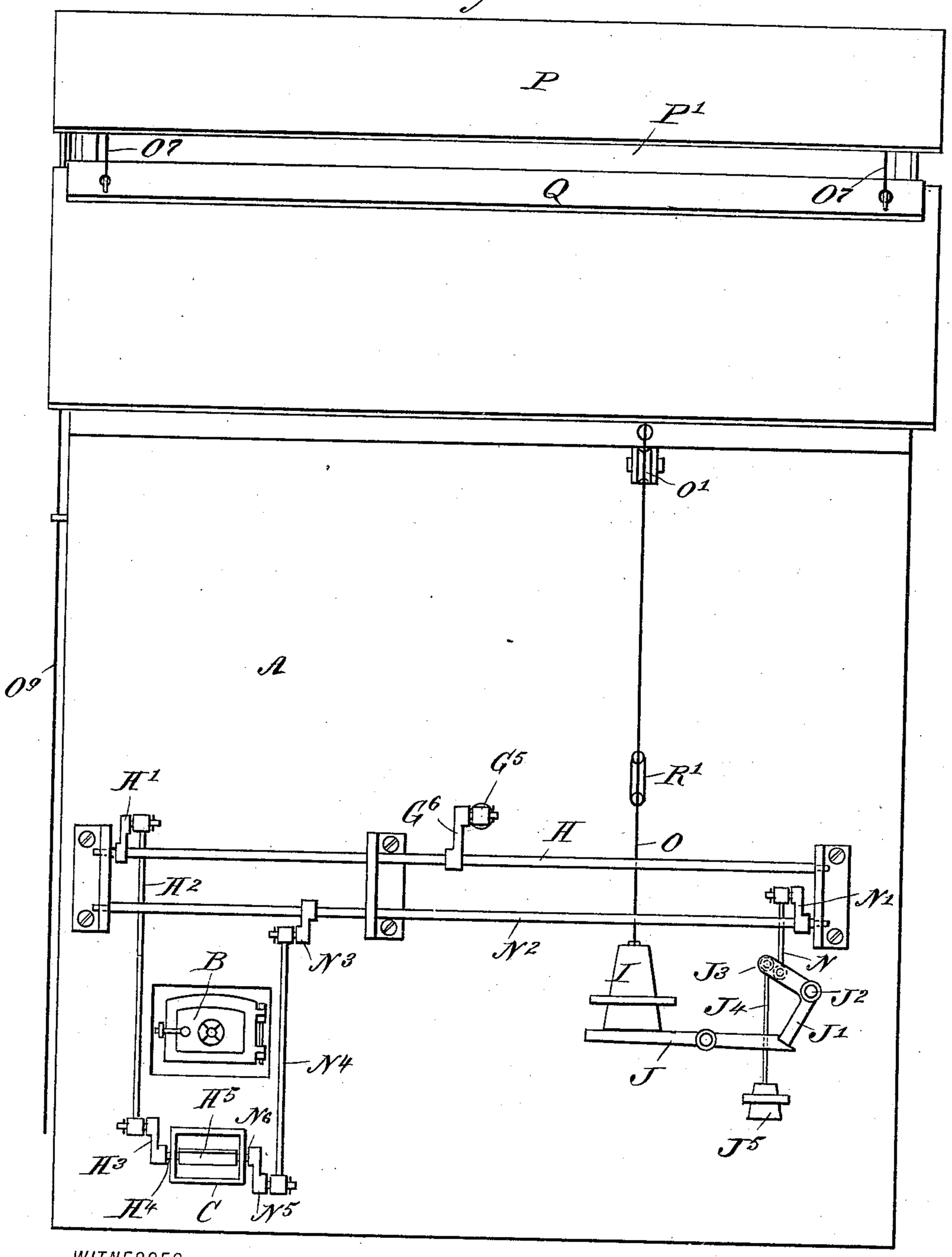
Fig. 3.



WITNESSES:

Donn Switchell

C. Sedgwick

INVENTOR

J. H. Johnson

BY

Munn & Co

ATTORNEY

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 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 accidental 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.

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 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 improvement.

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-regulating 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 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 piston 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 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 the mercury E. The other end of the lever G is pivotally connected by a link G^2 with an arm G^3 of a bell-crank lever pivoted inside of the building A on one of its walls and connected by its other arm G^4 with a link G^5, which extends horizontally to the outside through a suitable slot in one of the walls of the kiln. The outer end of the link G^5 is pivotally connected with an arm G^6, secured on a shaft H, extending longitudinally and mounted in suitable bearings secured to the outside of the kiln A. On the shaft H is also secured an arm H′, pivotally connected by a link H^2 with a crank-arm H^3, fastened on the outer end of a shaft H^4, extending transversely through the air-inlet pipe C and carrying a damper H^5, 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 the lever G and causes a downward movement of the other end of the lever connected with the arm G^3 of the bell-crank lever, which is connected by the arms G^4 and G^6 and the link G^5 with the shaft H. The latter is consequently turned, so that the arm H′ swings downward and causes a turning of the shaft H^4 by the link H^2 and the crank-arm H^3. The turning of the shaft H^4 closes the damper H^5 in the pipe C, so that the air from the outside 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 H^5 is moved 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 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 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 J^2, mounted to turn in suitable bearings in the wall of the building A and extending transversely to the inside of the same.

On the shaft J^2 on its outside is secured an arm J^3, from which hangs downward a rope J^4, supporting a weight J^5. The weight J^5 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 J^2 is secured an arm J^6, to the free end of which is secured a slack rope K, connected with a weight K′, resting on one end of a lever K^2, fulcrumed in the building and locked in place at its other end by a hook K^3, formed on the arm K^4 of a bell-crank lever, also fulcrumed in the building next below the lever K^2. The other end of the arm K^4 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 L^2, L^3, and L^4, diverging upward over the side wall and passing over suitable pulleys L^5, as is plainly shown in Figs. 1 and 2. The ropes L^2, L^3, and L^4, after passing over the pulleys L^5, each carry a weight L^6, so as to hold the lever L in contact with the lever K^4, whereby the latter is locked in place. From each of the ropes L^2, L^3, and L^4, hangs loosely a rope L^7, connected with a weight L^8, supported by a rope L^9 from a hook in the roof of the building A. The weighted arm J^3, secured on the outer end of the shaft J^2, is pivotally connected by a link N with the crank-arm N′, secured on the shaft N^2, 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 N^2 is also secured a crank-arm N^3, pivotally connected by a link N^4 with a crank-arm N^5, secured on a shaft N^6, extending transversely through the air-pipe C and located in the rear of the damper H^5, before mentioned. The shaft N^6 carries a damper N^7, similar in construction to the damper H^5, 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 O^2, secured on a shaft O^3, 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 O^3 near each end are secured the pulleys O^4 and O^5, over each of which pass the two ropes or chains O^6 and O^7, 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 O^3 is secured a pulley O^8, on which winds one end of a rope O^9, hanging downward on the outside 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 H^5 and N^7 in the furnace B are open. When the heat exceeds a normal degree, then the damper H^5 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 O^9 in the usual manner. When an accidental fire occurs in the kiln, one of the ropes L^9, supporting the weight L^8, is burned, so that the weight L^8 drops downward and causes an upward pull on the respective rope or chain L^2, L^3, or L^4, whereby the link L′ is moved upward and the lever L moves the arm K^5 of the bell-crank lever downward, and the arm K^4 swings sidewise, whereby the hook K^3 is disengaged from the lever K^2. The weight K′, resting on the latter, now drops, causing the arm J^6 to swing downward. This motion of the arm J^6 turns the shaft J^2, 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 O^3 in the dome P of the kiln A is turned, whereby the pulleys O^4 and O^5 wind up their respective ropes O^6 and O^7, 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 J^2 imparts a downward swinging motion to the arm J^3, which, by its connection by means of the link N and the crank-arm N′ with the shaft N^2, turns the latter, so that the damper N^7 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.