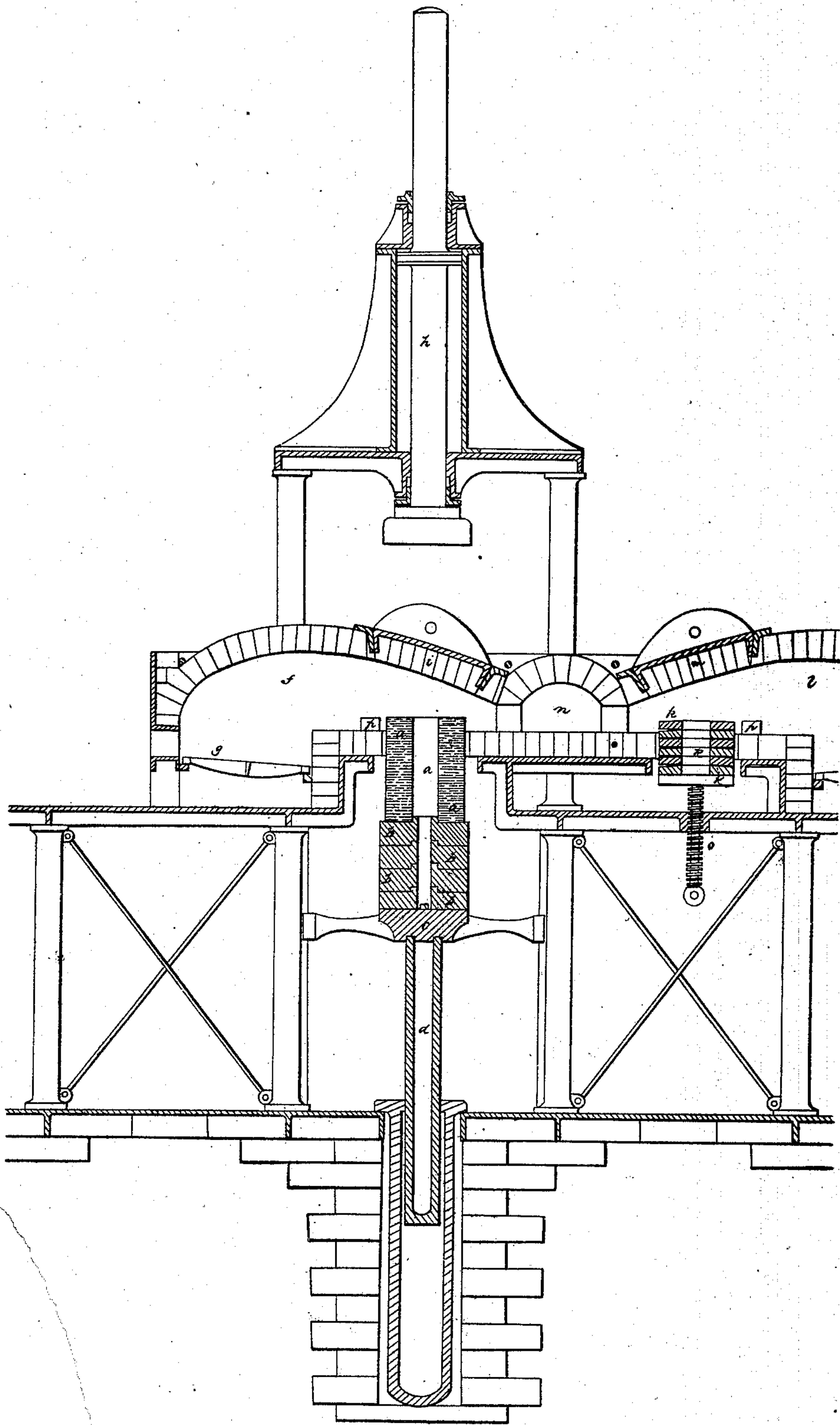


*A. Hitchcock.*

*Manufacture of Cannon.*

*Nº 49266.*

*Patented Aug. 8. 1865*



Witnesses

*William J. Brain*  
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# UNITED STATES PATENT OFFICE.

ALONZO HITCHCOCK, OF NEW YORK, N. Y.

## FORGING CANNONS.

Specification forming part of Letters Patent No. **49,266**, dated August 8, 1865; antedated July 30, 1865.

*To all whom it may concern:*

Be it known that I, ALONZO HITCHCOCK, of New York, in the county and State of New York, have invented certain new and useful Improvements in Forging Cannon and other Heavy Articles and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, making a part of this specification, and to the letters of reference marked thereon.

In fagoting up large masses of wrought-iron or steel for heavy cannon and other large forgings the material is often burned and always deteriorated in parts by the heating and working of other parts, and for this reason it has frequently been attempted to make cannon and mortars of hoops and staves combined together in such a manner that they will present sufficient resistance to answer the purpose intended without attempting to weld the component parts of the mass together. In some instances separate rings or hoops have been shrunk on a cylindrical core, and helices also have been first made of a continuous bar, and then had their several convolutions welded together, with as little exposure to heating as possible, to form a perfect cylinder.

The object of my invention is to make a cannon or other similar and analogous forging by combining and welding rings or hoops in such a manner that the fibers of the metal will be continuous and concentric with the axis, and the welding of the rings together consolidates the entire mass without exposing it to the action of the heat except at the points where the welding is to be effected, and at the time only when it is necessary to heat those parts in preparation for their junction. To effect this object the bottom of the forge or welding-furnace consists of an anvil-block supported by the ram of a hydrostatic press which carries the forging, and is gradually lowered as the rings of which it is composed are successively added and welded to the mass. Over the movable top of the furnace is placed a steam hammer of sufficient play or length of stroke to reach down into the forge when required. Adjacent to the welding-furnace is another furnace, in which the detached rings are separately brought to a welding-heat.

In practicing and operating my invention the upper surface and portion of the forging on the anvil-block of the welding-furnace and one of the rings in the adjacent furnace are brought to a welding-heat in the usual manner the top of the welding-furnace is then removed and the heated ring transferred from its own furnace and placed upon the heated end of the forging, and the steam-hammer is then lowered to strike the blows necessary to complete the welding and consolidate the ring with the forging, without removing the latter from its furnace. Having thus increased the size of the forging by the addition of one of the rings, the hammer is lifted and the top of the welding-furnace replaced, and the ram of the hydrostatic press is lowered sufficiently to present again only the upper surface of the forging to the action of the blast of the welding-furnace, as before described, while another ring is also being heated in readiness to be welded to the forging in a similar manner, and in this way the rings are successively added to the forging, and the latter lowered from the fire until it has attained sufficient length for the purpose desired. By this system of construction the cannon is composed of circular fibers disposed in the manner in which the continuous rings have been formed, and these rings are successively welded and consolidated together and removed from the action of the fire as the cannon is gradually brought to its entire length without exposing any part to the blast except when necessary to weld it to the adjacent part entering into the composition of the mass.

To enable others skilled in the arts to which it appertains to make and use my invention, I will proceed to describe its construction and operation with reference to the drawing.

The pile *a* or mass which is being built for the purpose of forming a cannon rests on the anvil-blocks, *b*, which are supported by the platen *c* and the ram *d* of a hydrostatic cylinder, *e*. The upper end of the pile projects through the bottom of the reverberatory furnace *f*, of which the grate is shown at *g*. Over the pile and the furnace is the steam-hammer, *h*, which has sufficient length of stroke to reach through the opening *i* in the top of the furnace and down to the top of the pile. The separate rings intended to be welded successively



to the pile are shown at *k* in the furnace *l*, which is constructed like the furnace *f*, and furnished with a similar opening, *m*, at the top, and delivers into the same flue *n* leading to the chimney. The rings *k* are elevated into their furnace through the bottom when required by means of the screw *o*.

The action of the furnace is regulated in the ordinary manner by controlling the blast and dampers, and the position of the loose firebricks *p* may be adjusted through the usual openings in the sides of the furnaces to direct the impinging currents upon the pile and rings. Suitable means may also be used to turn the forging when required for the purpose of regulating the application of the heat. When the top of the pile in one furnace and the upper ring in the other may have been brought to a welding-heat the blast and dampers are shut off, the coverings to the openings in the tops of the furnaces are removed, the ring transposed to the top of the pile, and as many blows as may be necessary are struck with the steam-hammer to consolidate it with the mass. The hammer is then withdrawn, the openings of the furnaces closed, the pile lowered by the hydrostatic press until only its upper surface is exposed to the welding-heat, and the rings screwed up until the upper one is similarly exposed, and the action of the furnace is then again resumed until the top of the pile and another ring are again heated in readiness for welding.

The arrangement and construction of the various parts may be varied without departing from the character of my invention, but I prefer the system which I have described and represented in the drawing. The furnaces may have separate combustion-chambers, and the rings may be heated singly on the floor of the furnace and removed through an opening in the side.

In practicing my invention it is advisable to

throw a shovelful of franklinite ore in the grate occasionally, so that the vapor of the zinc which enters into its composition may combine with the sulphur and other volatile impurities of the coal and prevent their impairing the iron. The openings through the bottom of the furnaces for the passage of the pile and the rings should be kept luted with clay, especially when only the natural draft of the chimney is used. Both the rings and the top of the pile should be protected with borate of soda or other similar flux. One of the sides of the rings should be slightly dished or convex, so that when its convex side is placed on the flat end of the pile the scoria and oxide are squeezed to the exterior with the flux by the action of the hammer, and the welding of the fagot or pile is commenced at its interior and continued toward the periphery. The hammer should be so heavy or the rings so thin that the entire mass of metal in the ring will be moved by the force of the blow, so that ingots of cast-steel molded in the shape of rings may be welded and laminated by the same operation and without intermediate manipulation.

The platen or head of the press is provided with suitable guides, and the anvil-blocks are left loose so that they may be removed on blocking up the pile for the purpose of making a forging equal in length to the distance between the press and the bottom of the furnace.

I claim as my invention and desire to secure by Letters Patent—

Making a cannon or other large forging by welding it in the furnace by the apparatus and in the method substantially as described.

ALONZO HITCHCOCK.

Witnesses:

DUNHAM J. CRANE,  
WM. KEMBLE HALL.