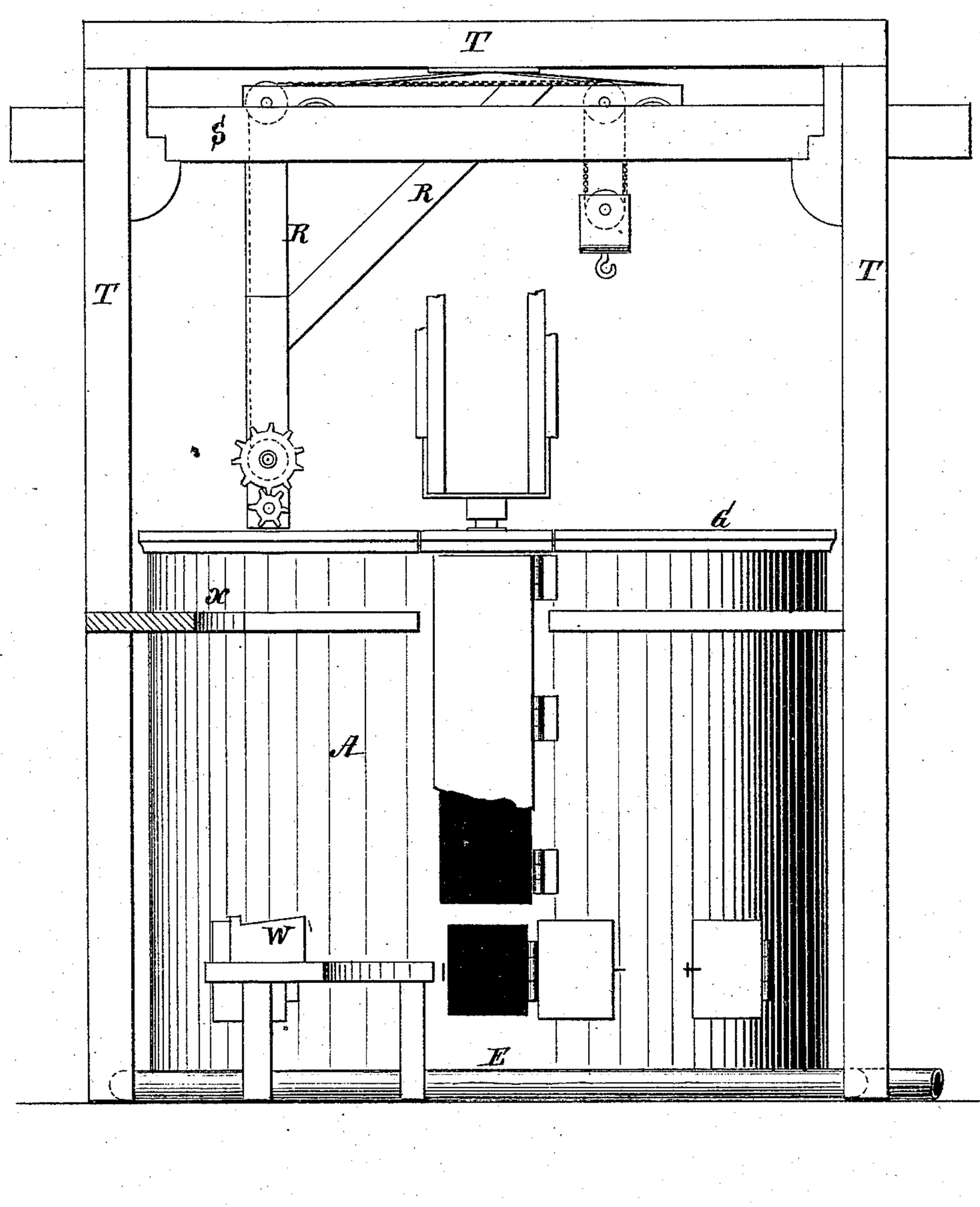
4 Sheets--Sheet 1.

B. S. BENSON.

Pipe Molding Apparatus.

No. 154,004. Patented Aug. 11, 1874.

Fig. 1.



WITNESSES:

G. Mathieu

Solon C. Kemon

INVENTOR:

B. S. Benson

BY Munn & Co

ATTORNEYS.

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B. S. BENSON.

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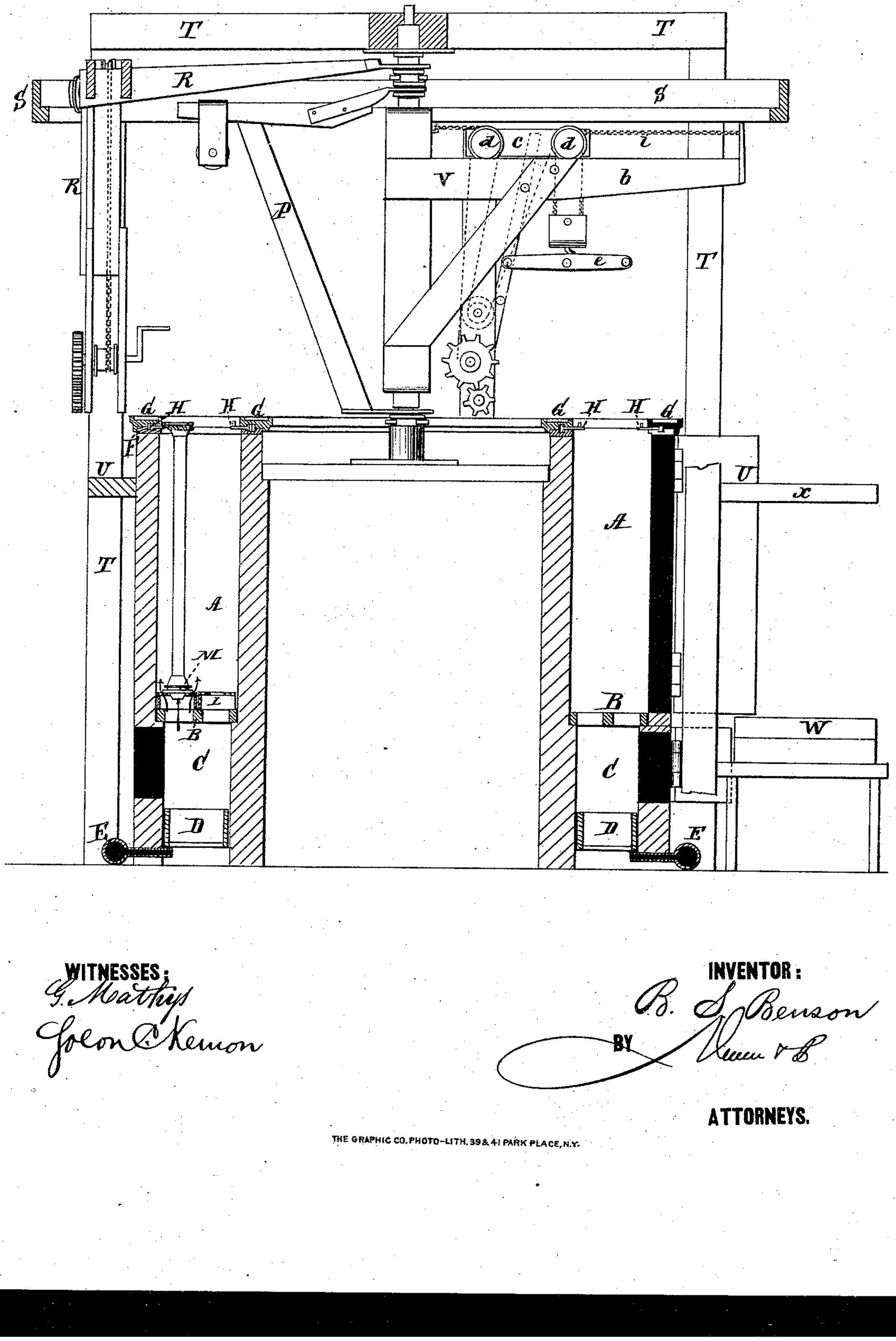
No. 154,004 Patented Aug. 11, 1874.

Fig. 2.



WITNESSES:
G. Matthys
Solon C. Kemon

INVENTOR:
B. S. Benson
BY Munn & Co
ATTORNEYS.

4 Sheets--Sheet 3.

B. S. BENSON.

Pipe Molding Apparatus.

No. 154,004. Patented Aug. 11, 1874.

Fig. 3.

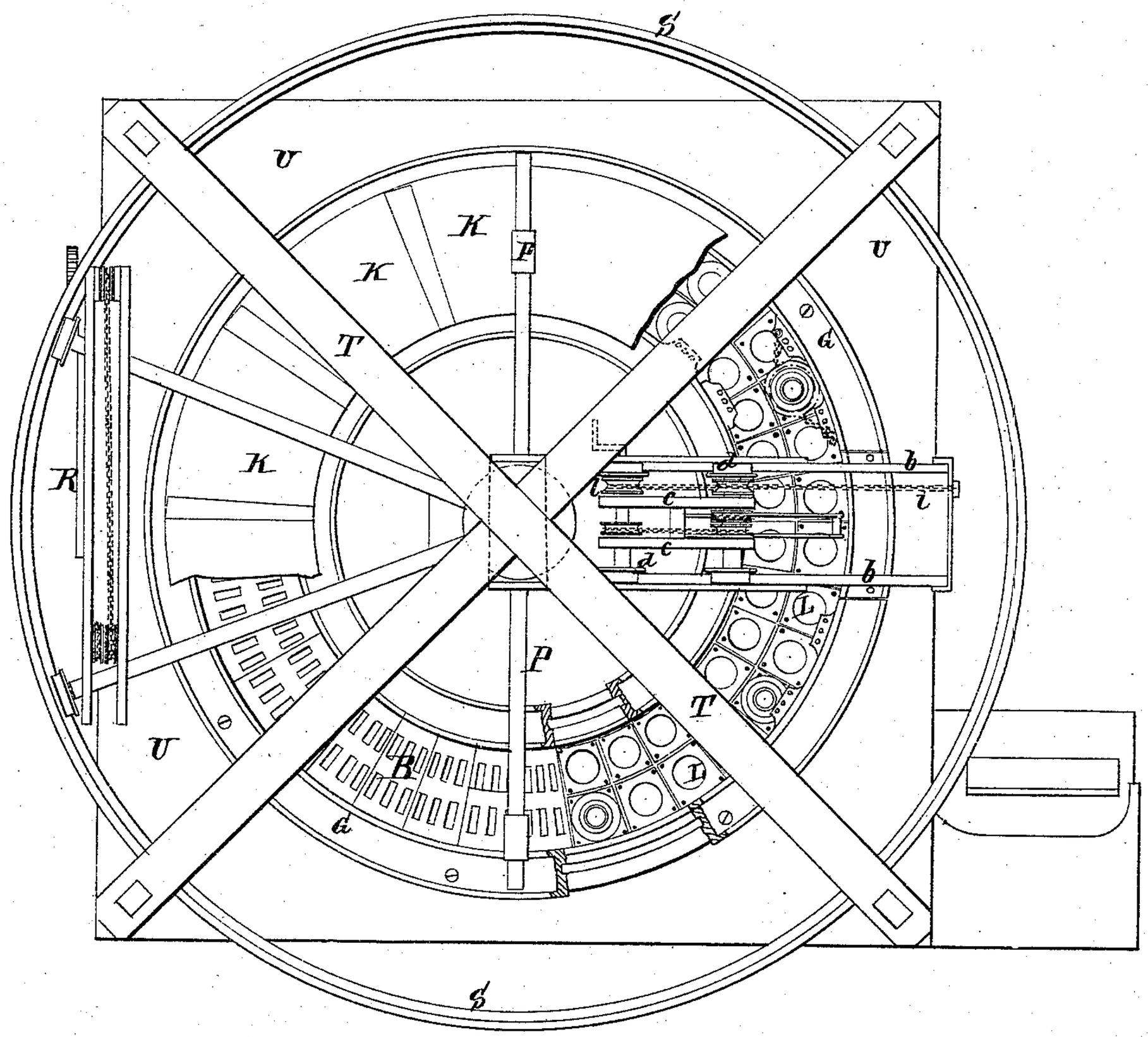


Fig. 4.

Fig. 6

Fig. 5.

WITNESSES:

G. Matthys.

Jocon & Kenon

INVENTOR:

B. S. Benson

Munn & Co

ATTORNEYS.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

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B. S. BENSON.

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Fig. 7.

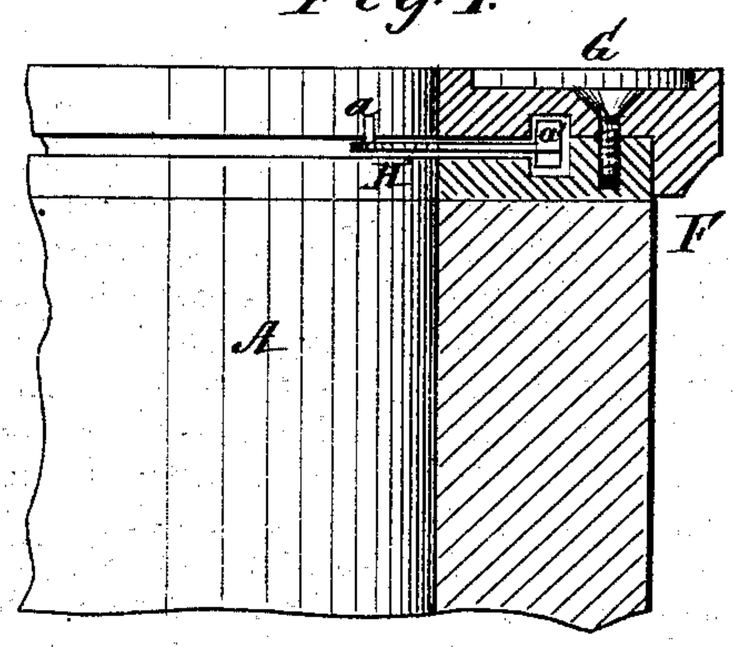


Fig. 8.

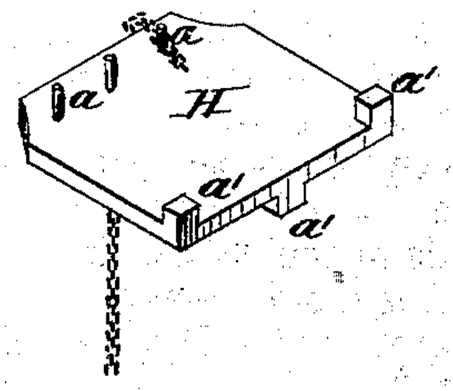
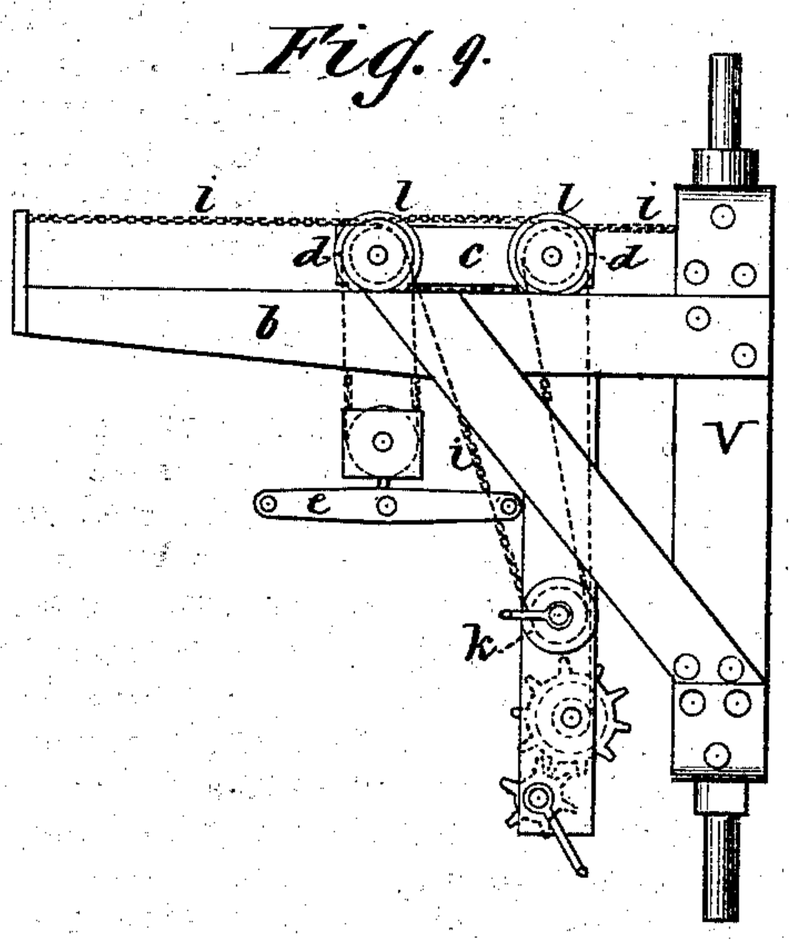


Fig. 9.



WITNESSES:

G. Matthys.

Solon C. Kemon

INVENTOR:

B. S. Benson

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

BENJAMIN S. BENSON, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN PIPE-MOLDING APPARATUS.

Specification forming part of Letters Patent No. **154,004**, dated August 11, 1874; application filed April 4, 1874.

CASE B.

To all whom it may concern:

Be it known that I, BENJAMIN S. BENSON, of Baltimore city, State of Maryland, have invented a new and useful Improvement in Manufacture of Metal Pipe; 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 forming a part of this specification, in which—

Figure 1 is a side elevation of the pit and hoisting appliance. Fig. 2 is a sectional elevation. Fig. 3 is a plan view. Fig. 4 is a plan top view of one of the "stools." The remaining figures are, respectively: 5, a vertical section of the stool, chill, and blast-check; 6, a plan of the blast-check device; 7, a detail sectional view of the top of the pit; 8, a perspective view of one of the flask-locking plates; and 9, a side view of the double crane.

The object of my invention is to provide an improved pit or oven for drying pipe-molds and casting pipe therein, together with improved appliances or apparatus connected therewith for hoisting, carrying, adjusting, supporting, and locking or fastening the mold-flasks. To this end, the construction is as follows:

Referring to the drawing, the pit or oven A is represented as circular, but it may have any other suitable form, and is provided with a perforated floor or bottom, B, Fig. 2, which separates the combustion-chamber C from the drying and casting oven or pit above. The walls of the pit are constructed of fire-brick or other suitable material. A series of fire-boxes or fuel-receptacles, D, are arranged in the annular combustion-chamber C, and an air-blast is admitted to each from a pipe, E, extending around the pit and leading to any suitable air-forcing apparatus. Thus, when the fuel in the fire-boxes D has been ignited and the blast let on, the heated air and products of combustion are driven up through the perforations or openings in floor B of the oven, and act on the molds and flasks which are placed therein, in a manner hereinafter described.

The top of the inner and outer vertical walls of the pit are capped by metal plates F, which are grooved on the upper side, as shown, Fig. 7. A series of plates or panels, G, are applied to the cap-plates F and provided with a downwardly-projecting flange on the outer side, also a groove on the under side corresponding or coinciding with the groove in caps F, and have upwardly-projecting flanges on the upper side. These plates are secured to the caps F by screws, which permit them to be adjusted or clamped in position, as required to hold the adjustable or sliding plates H, Fig. 8; the latter have flanges or ribs *a'* fitting in the groove formed, as above described, between caps and plates F and G, and are provided with fingers or studs *a* at the outer edge, to which are attached the chains I, that hold the flasks in position in the pit. (I do not limit myself to the use of two grooved plates, F and G, since the finger-plates H may be secured almost or equally as well if but one of the plates F G be grooved.) The top flanges of the adjustable plates G form a trough or gutter that holds the sand necessary for luting the edges of the flanged panels K, which are used for covering in the annular oven A, when the same is filled with flasks and molds to be subjected to the drying process. Thus much for the pit or oven proper.

An important feature of my invention is the stools L, Figs. 4 and 5, upon which the flasks and molds are set and supported in the oven. The stools are open at the bottom, and have small holes through the top, ordinarily one at each corner, and a large central opening, to adapt them to receive the chills M. The latter are constructed substantially as described in my patent of September 3, 1861, No. 33,178; but in conjunction with them I use a blast or air check device, O, Figs. 5 and 6, which is a perforated disk—made of clay, metal, or any other material adapted for the purpose—to be placed in the chill or any part of the mold found most convenient. It is in any case made of such diameter as to prevent it dropping through the tapered circular aperture or passage in the chill M. The stools inclose each a certain number of holes in the bottom of the pit, so that when the pit is filled with flasks the holes are all covered by the stools and the hot air finds its way upward through them, and not else-

where. The stools are all luted with clay or sand previous to commencing the drying operation, to properly confine the heat and air-blast. The use of these stools and the appliances for securing the flasks vertically obviate the objections practically existing to placing the flasks directly on the floor-plates of the bottom of the pit.

I will now describe the appliances for handling and supporting the flasks, &c. The cranes P, Figs. 2 and 3, are used for hoisting and lowering the cores used in the molds, and are of a well-known or ordinary construction. The crane R, Figs. 2 and 3, for carrying the ladle containing the molten metal for casting the pipe has friction-rollers at the outer ends of its horizontal beams, which travel on an elevated circular track, S, that is supported by the frame-work T. These beams are connected by others, from which depends a third. The workmen who operate this crane travel on the platform U, Figs. 2 and 3, which is supported between the outer wall of the oven and said frame-work.

The double crane V, on which I propose taking out separate Letters Patent, is composed of the pivoted frame *b* and carriage *c*, having rollers *d*. Said carriage is reciprocated by a chain, *i*, passing over pulleys K and L, the former of which is fixed on a hand crank-shaft. This crane is used chiefly for hoisting flasks, carrying them into and out of the pit.

The molds having been properly formed in the flasks by a molding-machine, the flasks are hoisted by the double crane, carried through the side door of the oven, and swung around in the annular cavity to their proper position, where they are set on the stools and secured vertically, each between two of the fingered plates H, by chains that pass around them, as shown. The plates H are adjusted at the time, or previously, at such distance apart as will accommodate the size of flask or mold. The molds are then carefully inserted, the stools luted on the perforated bottom of the pit, the cover-plates also adjusted over the top of the pit, and the blast let on. The hot air and products of combustion pass up through the holes in the stools and impinge on and heat the outside of the flasks, and, through the check-disks, into and through the molds and flasks. Thus the molds are heated and dried inside and outside simultaneously, and in a comparatively short space of time. When the operation is complete the cover-plates of the pit are displaced or removed, and the casting process begun, the cores being first inserted in the molds.

The cores are soon after extracted and the flasks unlocked and taken out of the pit by the same double crane, and set up on the beveled or inclined and flanged block or table W, Figs. 1 and 2, and leaning or inclined against the semicircular platform or rest *x*. When thus placed the clamps are knocked off on one side of the flasks and the contained pipe drawn out, the molding-sand being removed during the latter operation. As fast as the pit is thus cleared it is ready to receive a fresh supply of molds, and hence the work commences *de novo*.

Having thus described my invention, what I claim as new is—

1. A stool or support for flasks in the drying-pit, the same having a central opening for the chill and air or blast holes surrounding it, substantially in the manner specified.

2. The combination, with the molds, of perforated air or blast check disks, as shown and described.

3. The combination of the adjusting or clamp plates G and finger or locking plates H, arranged on the vertical wall of the pit, as and for the purpose specified.

4. The combination of flask-locking chains, finger-plates H, and clamp-plates G, as shown and described.

5. The combination of the crane R, provided with friction-rollers, and the circular rail or track S, supported by frame-work T, for operating in connection with the circular pit, as shown and described.

BENJAMIN S. BENSON.

Witnesses:

L. TISCHMEYER,

C. I. SEIP.