May 3, 1932. S. B. CLARK 1,856,863

PIPE ANNEALING FURNACE

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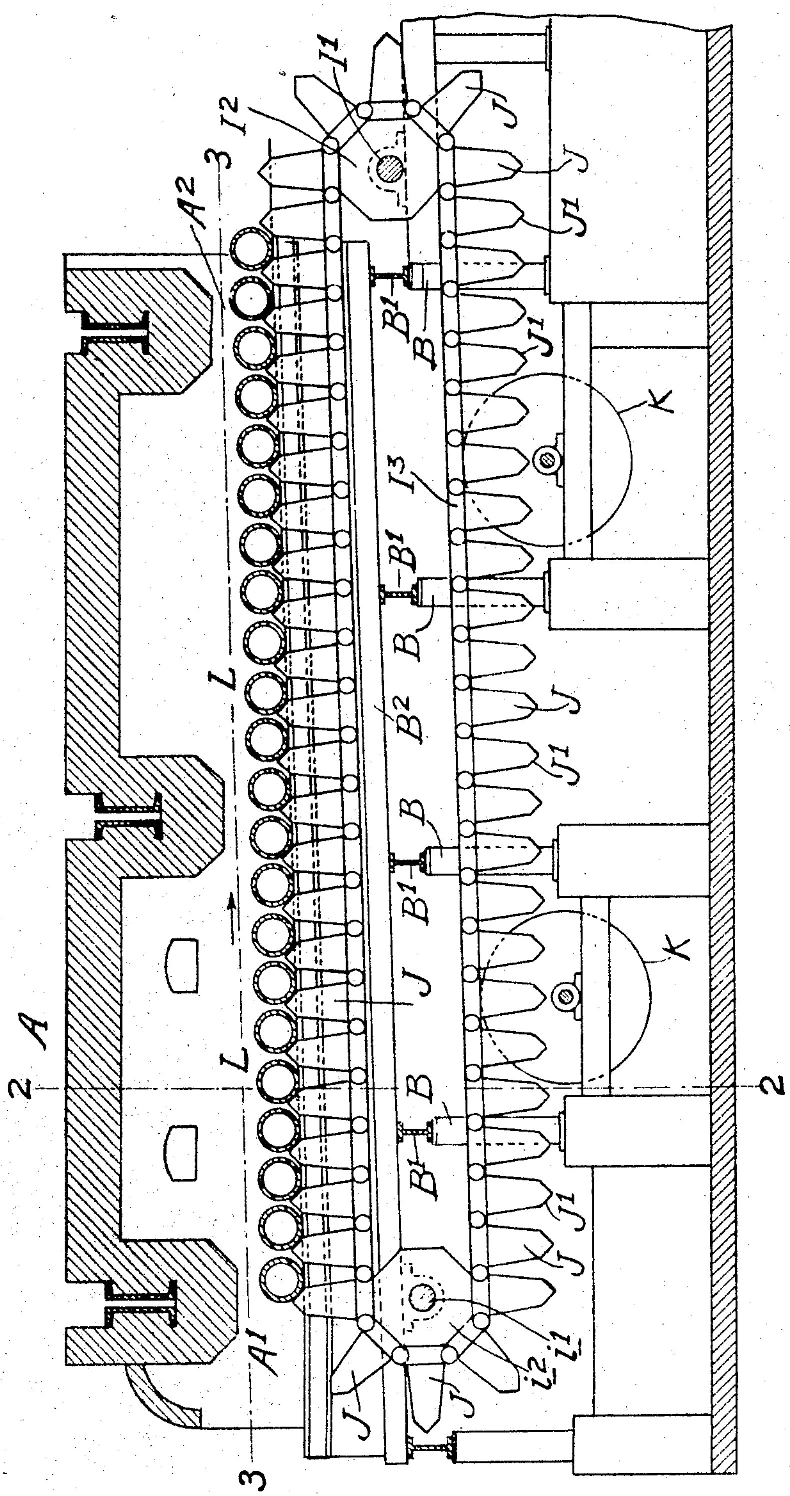
Fig. 1



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PIPE ANNEALING FURNACE

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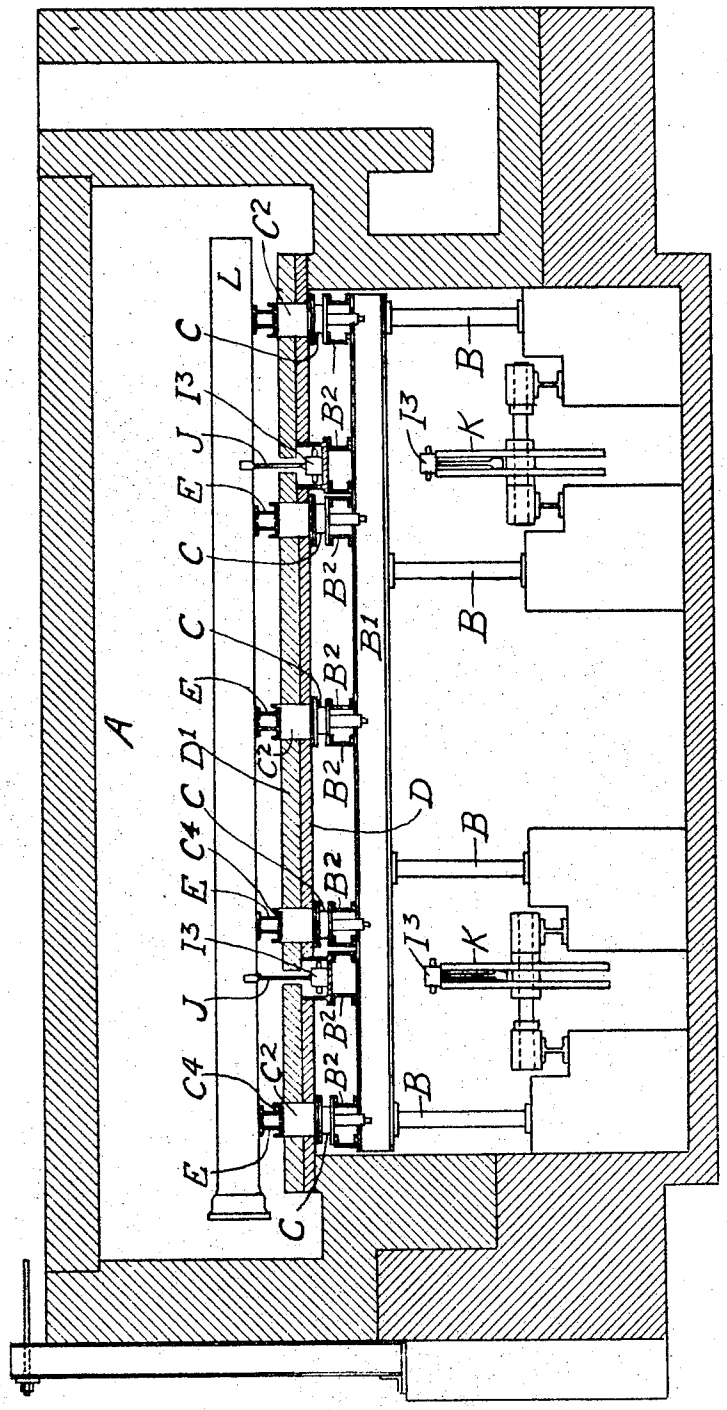

Fig. 2

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PIPE ANNEALING FURNACE

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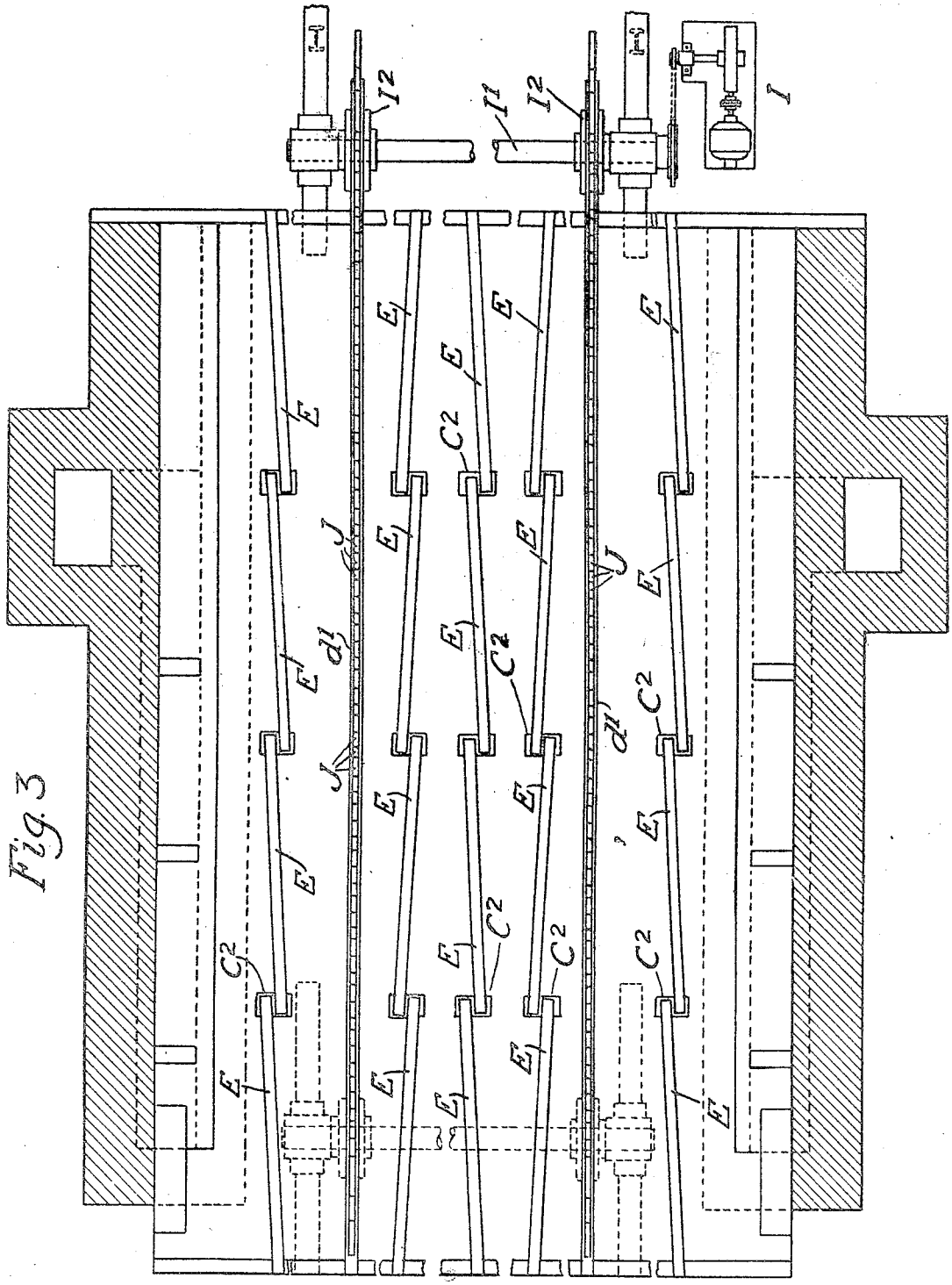

Fig. 3

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PIPE ANNEALING FURNACE

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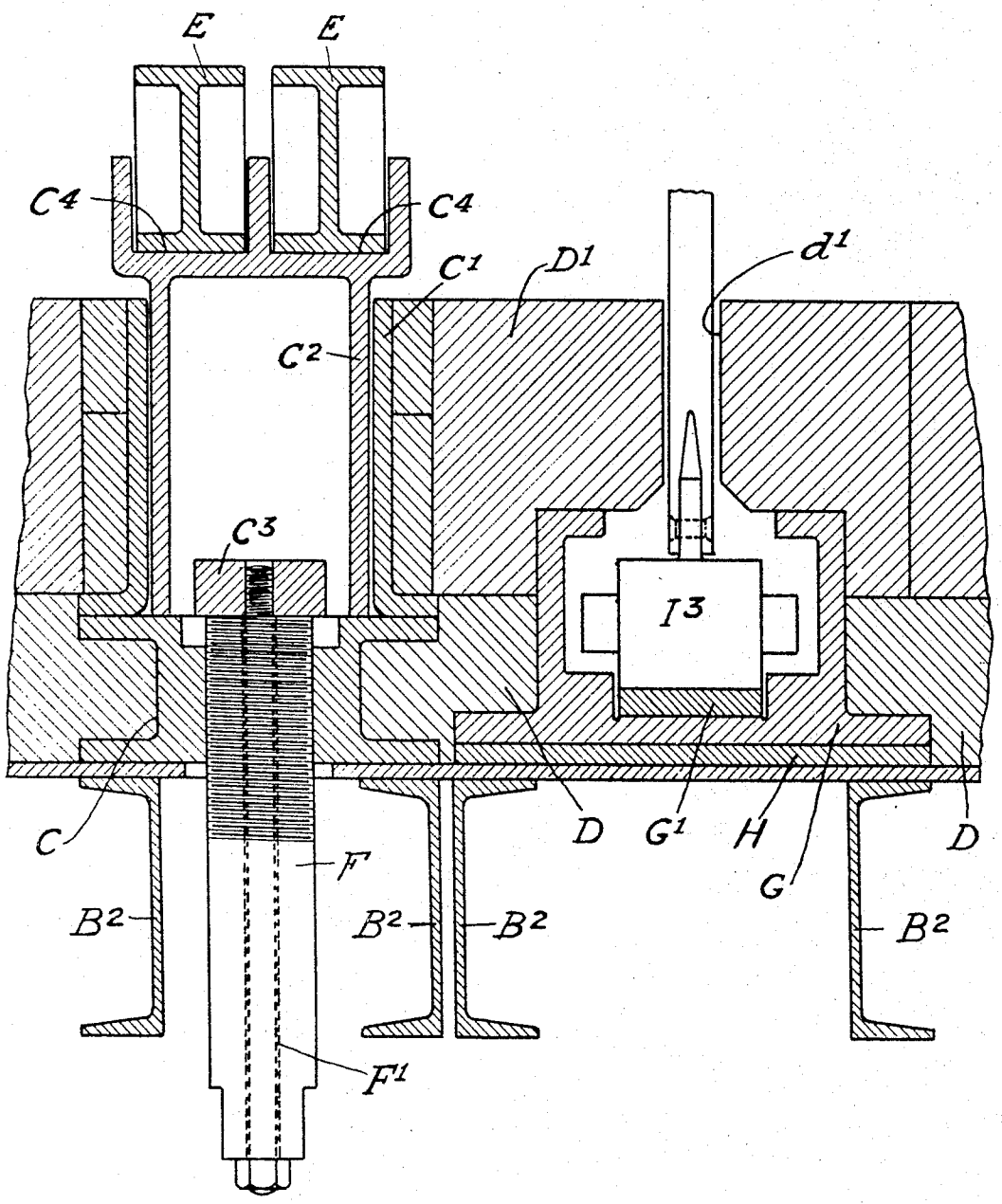
Fig. 4



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1,856,863

UNITED STATES PATENT OFFICE

STUART B. CLARK, OF RIVERTON, NEW JERSEY, ASSIGNOR TO UNITED STATES CAST IRON PIPE & FOUNDRY COMPANY, OF BURLINGTON, NEW JERSEY, A CORPORATION OF NEW JERSEY

PIPE ANNEALING FURNACE

Application filed December 14, 1928. Serial No. 326,130.

My invention relates to pipe annealing furnaces and particularly to the mechanism for supporting the pipes in and moving them through the furnace. The object of my invention is particularly to provide means for supporting and transporting the pipes through the furnace which would be of such a character that the pipes will have no tendency to roll forward on the runways which support them; to provide runways of such a character that the portions of the pipe in contact with the runways will continuously change as the pipes move forward through the furnace; to provide means for adjusting the plane of the runways and to provide propelling fingers adapted to engage the pipes in such a way that in case of obstructions occurring on the runways the fingers will tend to lift the pipes over them. By preference I arrange the runways in a plane which slopes upward from the entrance to the exit of the furnace and in all cases I so dispose the runways that they will have no downward slant toward the rear end of the furnace.

My invention will be best understood as described in connection with the drawings and the novel features which I desire to protect by Letters Patent will be clearly pointed out in the claims.

In the drawings

Figure 1 is a longitudinal vertical section through a furnace provided with my improvements.

Figure 2 is a cross section on the line 2—2 of Figure 1.

Figure 3, a plan view taken as on the line 3—3 of Fig. 1, and

Figure 4 is a fragmentary view showing details of construction.

A indicates the furnace which is of usual type and which it will be understood is here rather diagrammatically shown, that is to say, no attention has been paid to the proportions of the furnace. B, B, etc., are a series of columns supporting beams indicated at B^1 which in turn support the beams indicated at B^2. On this last series of beams is supported the bottom of the furnace indicated at D and D^1. C, C, etc., are a series of internally threaded nuts supported on the beams B^2 and supporting in turn guideways indicated at C^1 in which guideways are vertically movable chair supports indicated at C^2, having, as shown, cross bars C^3 at their lower ends and chairs C^4, C^4, formed at their upper ends. On these chairs are supported the ends of the rails or beams indicated at E, E, etc., which are formed of highly heat resisting material and which, as shown in Figure 3, are set at an angle to the line of travel of the pipes through the furnace and so disposed as to form a series of runways extending through the length of the furnace, which runways are preferably set in the plane sloping upward from the entrance to the exit of the furnace and in no case is the plane of the runways inclined downward toward the exit of the furnace, that is to say, the plane of the runways may be horizontal but, for the best results, should be slanted upward as described.

The chairs supporting the rails or beams forming the runways are vertically adjustable, as shown, by means of screws F, the threads of which are engaged with the internally threaded nut C and upon which rest the cross bars C^3 of the vertically movable chair support C^2. As shown, the cross bars C^3 are perforated to receive and engage threaded ends of rods F^1 extending through the adjusting screw F and having a clamping nut screwed on their lower ends.

Also supported on the beams B^2 are runways indicated at G, having wearing plates G^1 at their bottom on which rest the chains I^3. These runways are open at the top, as shown, and communicate with slots d^1 formed in the bottom of the furnace to give passage to the fingers which are attached to the chains.

I indicates a motor operatively connected to a shaft I^1, to which shaft are secured sprocket wheels indicated at I^2, I^2. These sprocket wheels engage and propel the chains indicated at I^3 which, at the opposite end of the furnace, pass over sprocket wheels i^2 secured on the shaft i^1.

Secured to the links of the chain are the pipe propelling fingers indicated at J. These fingers are of such length that their upper

ends extend beyond the plane of the runways so as to engage the pipes supported on the runways and the novel feature of my construction consists in forming the pipe engaging ends of the fingers with a considerable rearward slant with reference to the plane of the runway so that they will engage the pipes on their under sides. As shown, the fingers have their upper ends J^1 formed with 45° slants in both directions, thus providing for a reversal of the fingers in case their pipe contacting surfaces become worn. To function properly the angle of the contacting portion of the fingers to the plane of the runway should not be less than 30° to the plane of the runway.

K, K, indicate supporting wheels, the upper surfaces of which contact with the chains and prevent too great sagging of the chains.

L, L, etc., indicate pipes passing through the furnace.

In operation the pipes to be annealed, for instance, centrifugally cast cast iron pipes made by the de Lavaud process, are fed to the runways at the entrance of the furnace, indicated at A^1, each pipe in the construction shown being engaged by two of the fingers J, the chain being in motion in the direction indicated by the arrow in Figure 1. The pipes are carried forward by the contacting ends of the fingers over the horizontal or preferably upwardly inclined runways, keeping constant contact with their propelling fingers and having no tendency to roll forward into contact with the fingers in front of them. This is important because very slight impacts with highly heated pipes are apt to deform them. In case of obstructions being met with on the runways, the inclined contacting ends of the fingers tend to lift the pipes over such obstructions. The pipes pass through the furnace and are delivered at the exit end thereof, indicated at A^2 and in their travel over the runways, by reason of the angular set of the rails making up the runways, the portion of the pipes in contact with the runways is constantly shifting and this is a feature of importance as if the contact was always with the same portion of the pipe there would be some tendency to deformation or uneven annealing.

By providing means as described for adjusting the rails or beams forming the runways I am enabled to maintain the plane of the runways at the best angle and to provide for slight deformation of the rails as by warping.

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

1. A pipe annealing furnace having at its bottom runways for supporting the pipe disposed in a plane lying within a range of angular positions between the horizontal and various upwardly inclined angles from the entrance to the exit of the furnace in combination with spaced pushing fingers adapted to project upward beyond the runways to engage the pipes supported thereon and adapted in connection with the plane of the runways to maintain contact with the rear of the pipes being transported through the furnace and means for moving the fingers through the furnace and returning them to operative position at the entrance of the furnace, the contacting portion of the fingers being inclined backward to an angle in excess of 30° to the plane of the runways.

2. A pipe annealing furnace having at its bottom runways for the pipes made up of lines of rails in combination with chairs for supporting the ends of the rails and means for vertically adjusting said chairs.

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