J. V. GITHENS.

HEAT TREATING AND FORGING FURNACE.

APPLICATION FILED MAR. 29, 1918.

1,298,327.

Patented Mar. 25, 1919

4 SHEETS—SHEET 1.

Fig. 1.

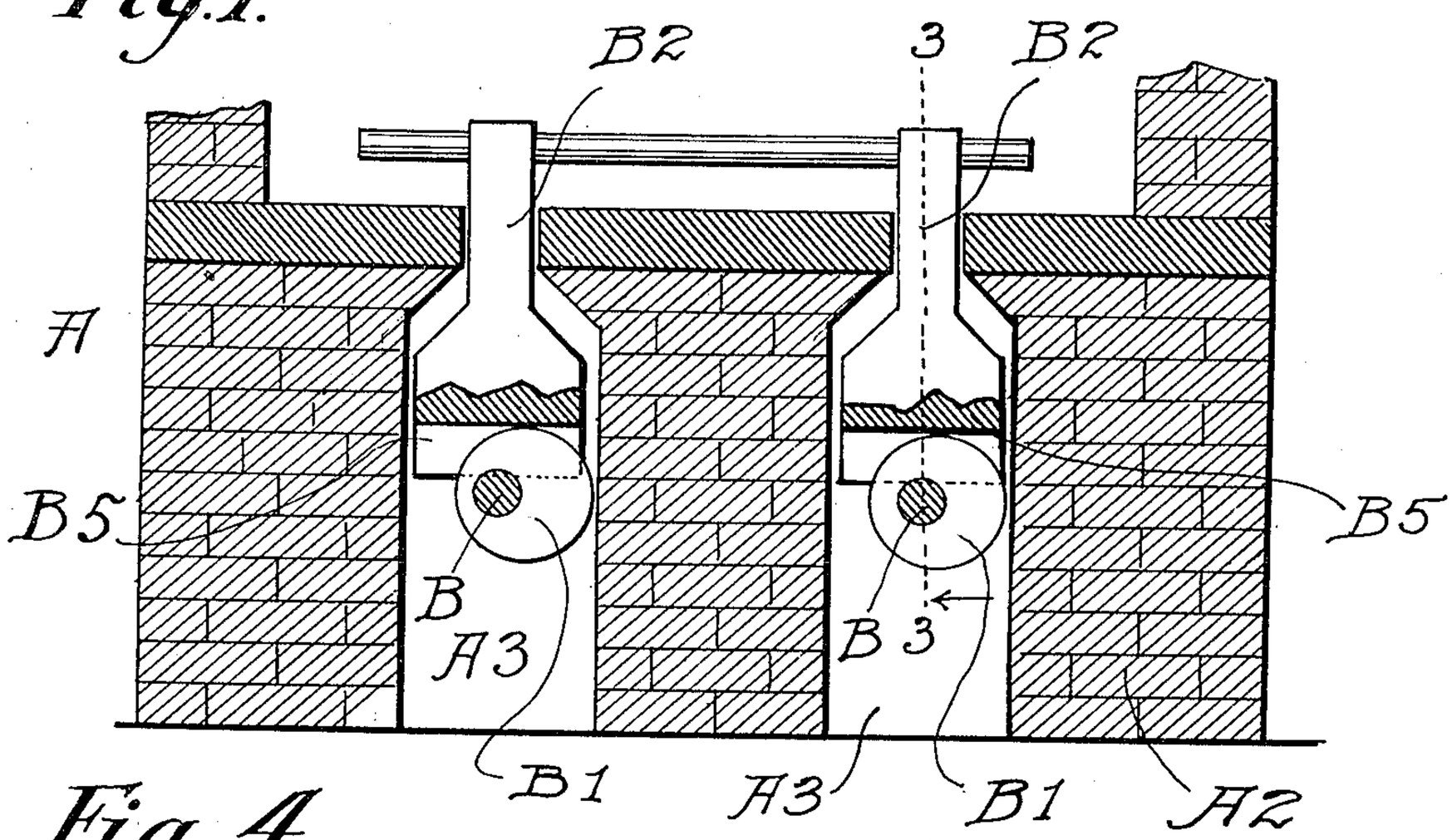
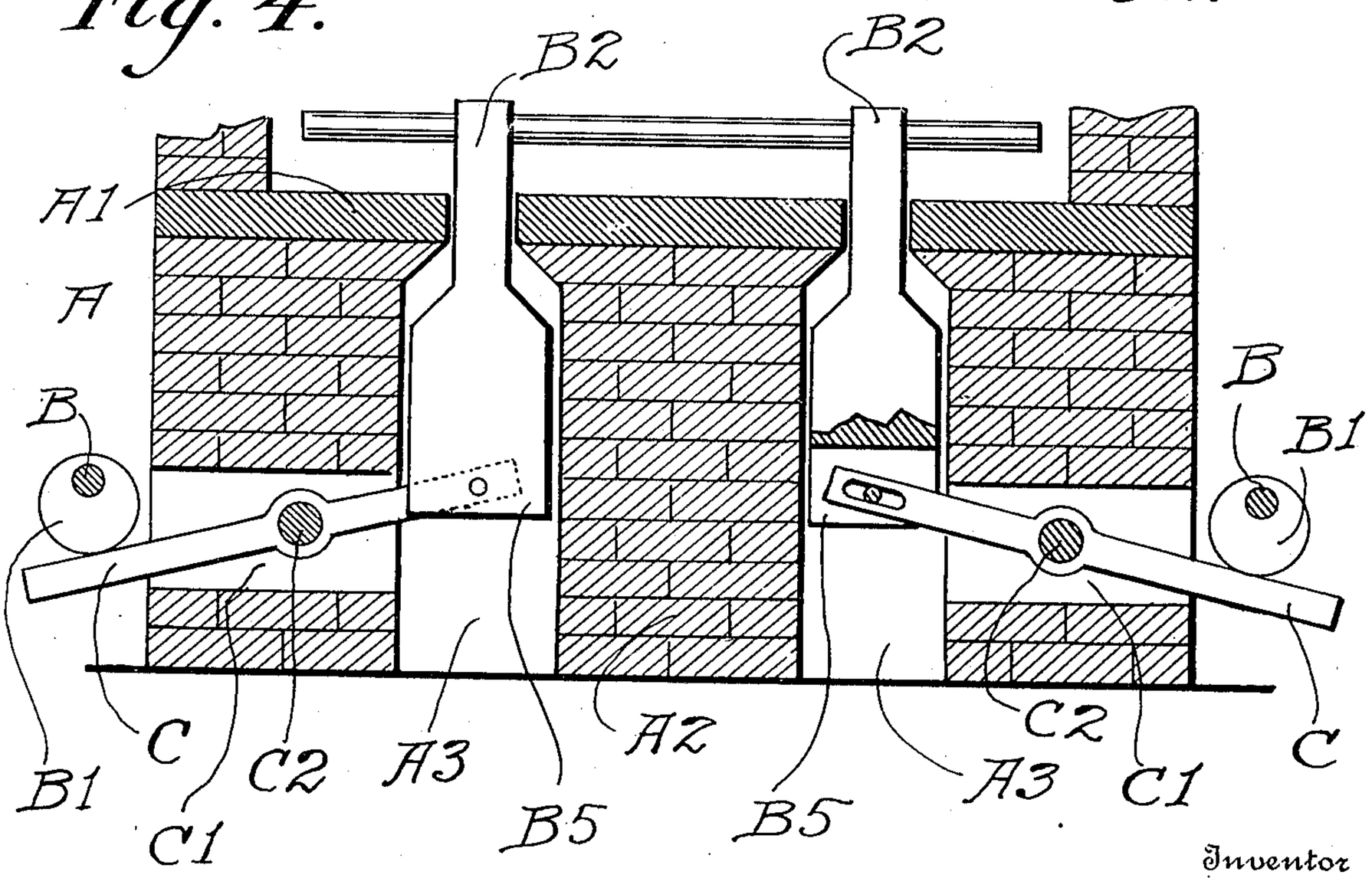


Fig. 4.



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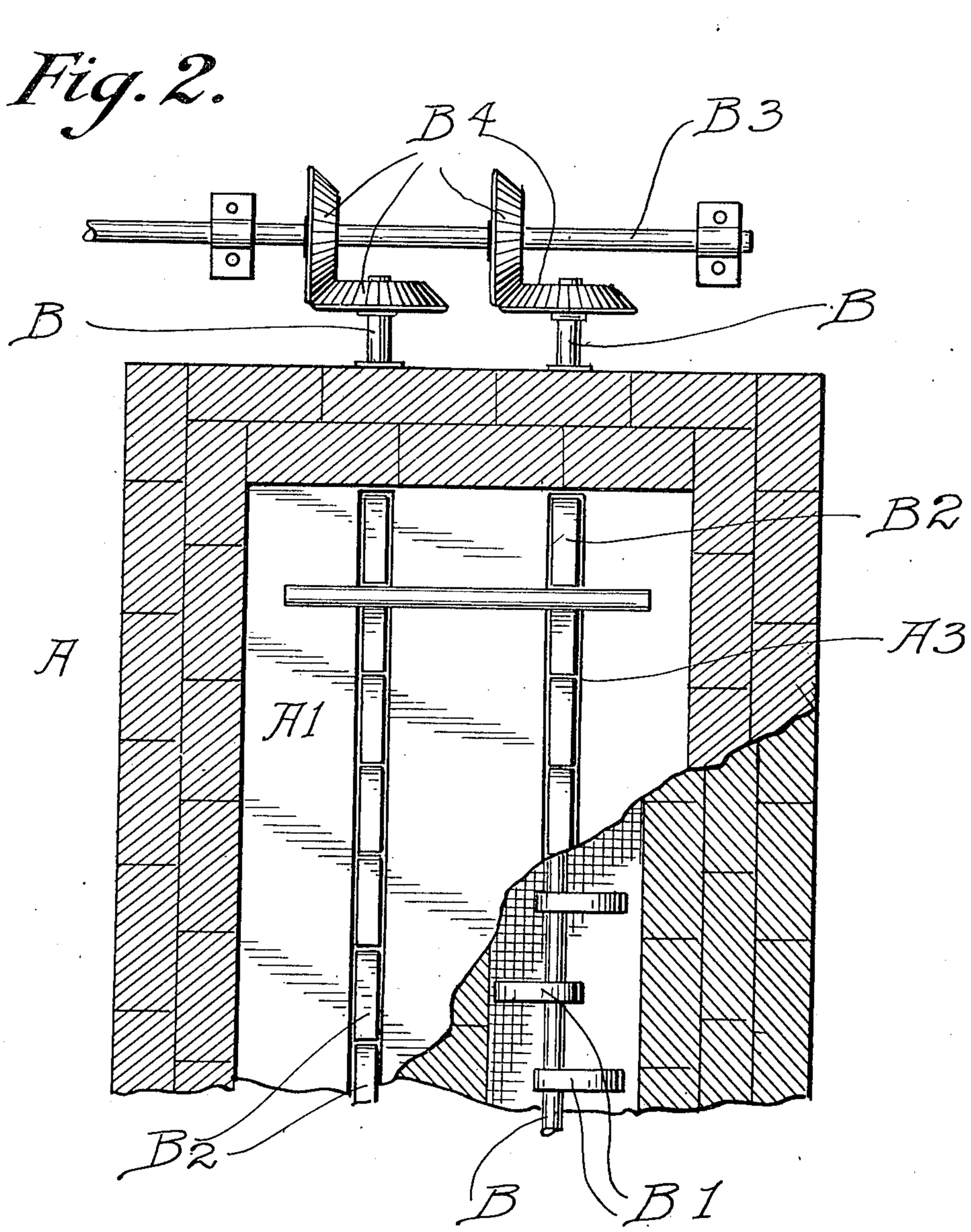
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

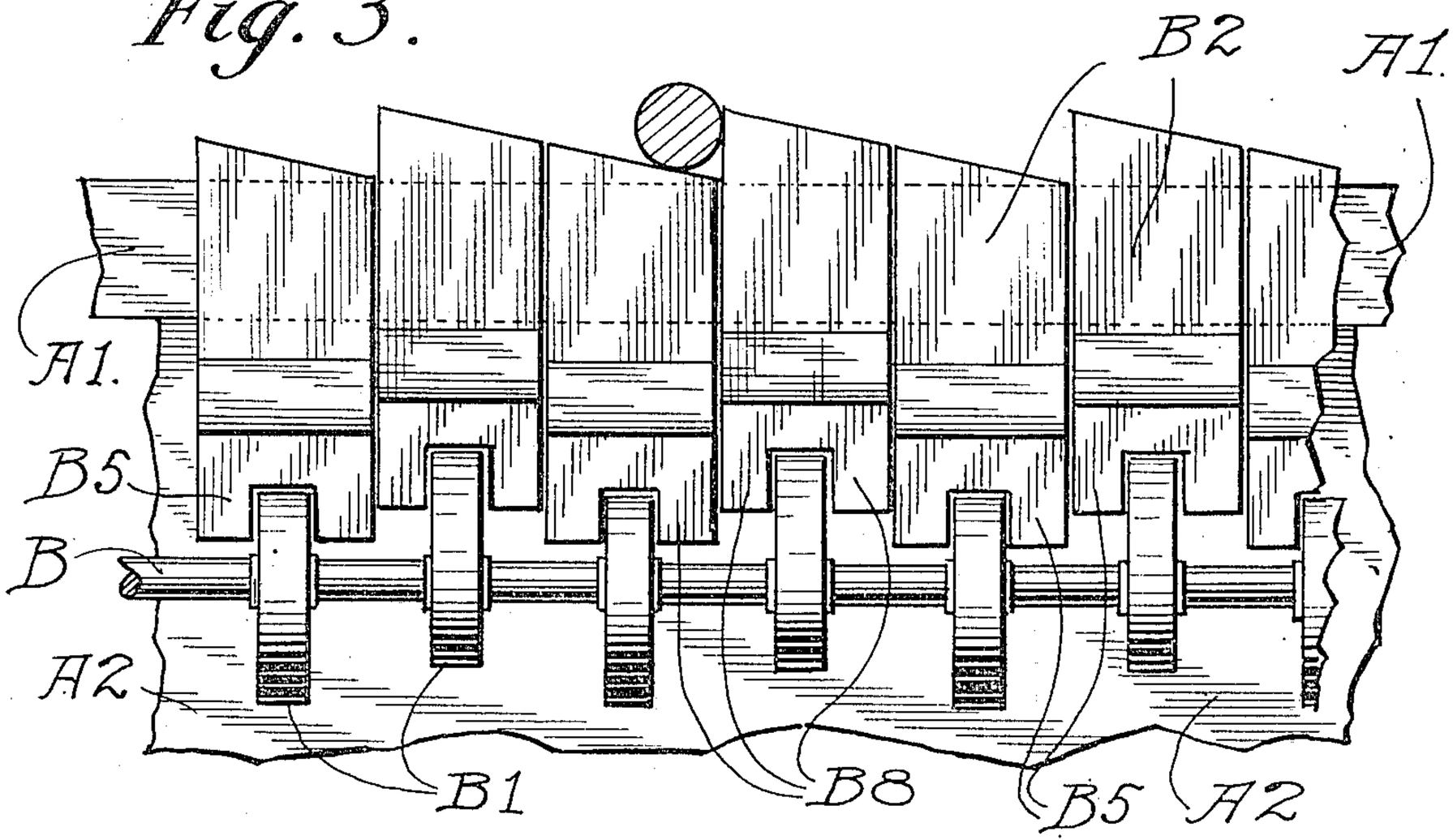


Fig. 6.

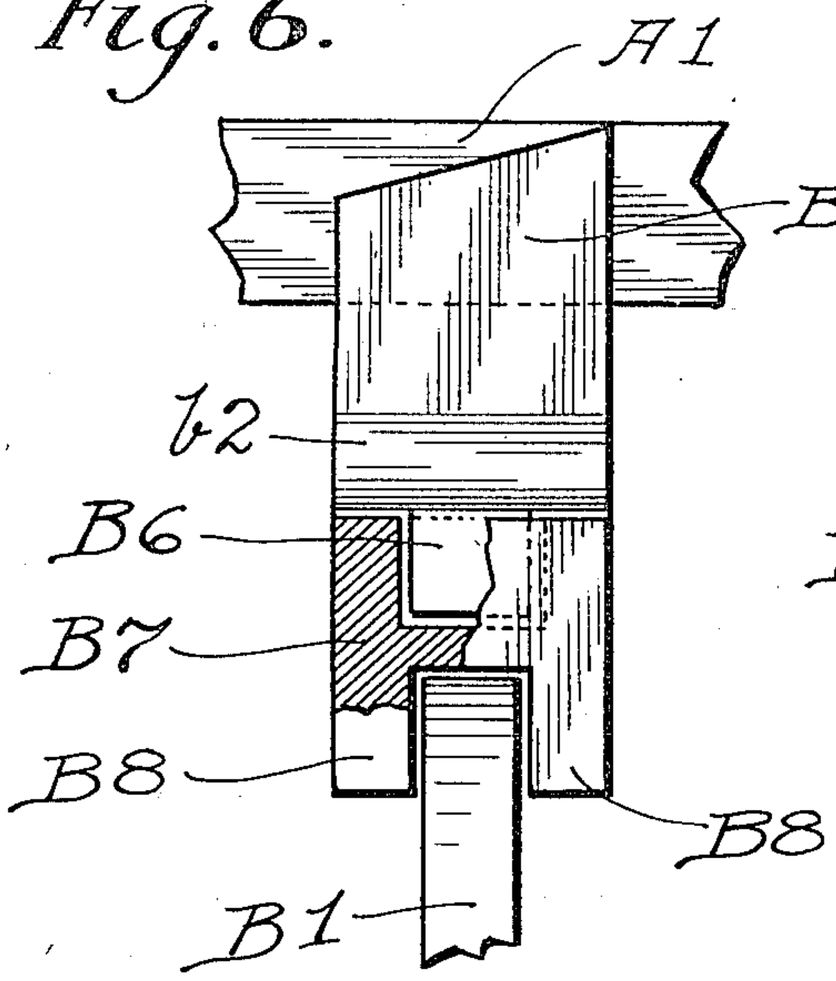
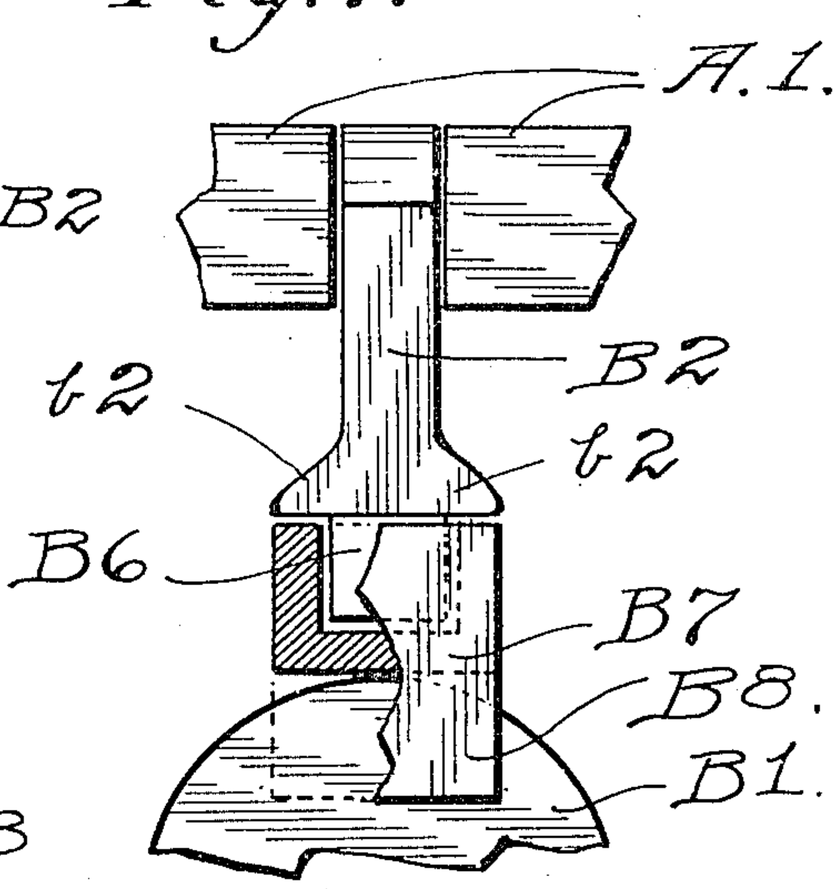


Fig. 7.



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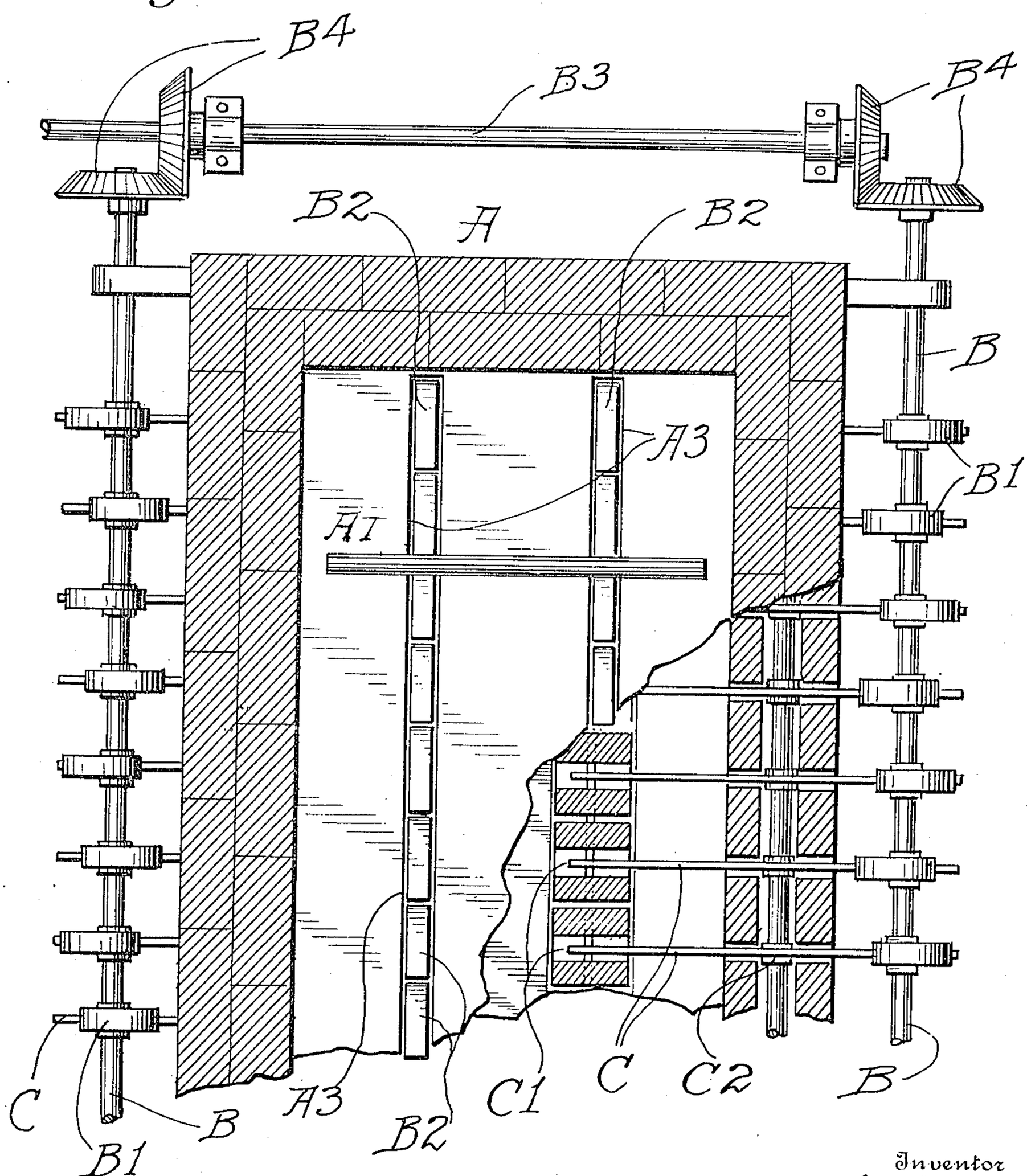
4 SHEETS—SHEET 4.

Fig. 5.



Inventor

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UNITED STATES PATENT OFFICE.

JAMES V. GITHENS, OF KNOXVILLE, TENNESSEE.

HEAT-TREATING AND FORGING FURNACE.

1,298,327. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed March 29, 1918. Serial No. 225,564.

To all whom it may concern:

Be it known that I, JAMES V. GITHENS, a citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented a new and useful Improvement in Heat-Treating and Forging Furnaces, of which the following is a specification, reference being had to the accompanying drawing.

My improvement relates particularly to furnaces for use in industrial operations requiring the heating of articles for the purpose of forging or annealing or similar treatment.

The object of the invention is to incorporate in such a furnace improved means for moving the articles to be treated progressively through the furnace chamber.

Furnaces of this type have heretofore been made with means intended to move such articles through the furnace chamber; but such means have been deficient in important respects, one of which is the requirement of a relatively large amount of power to operate the apparatus which moves the articles.

One feature of my apparatus is its adaptability to move the articles by rolling instead of bodily lifting them.

In the accompanying drawings,

Figure 1 is a transverse section illustrating a furnace embodying my improvement, the view being toward the rear or discharge end of the furnace;

Fig. 2 is a horizontal section of the structure shown by Fig. 1;

Fig. 3 is a section on the line, 3—3, of Fig. 1, looking toward the left;

Fig. 4 shows a form in which levers are interposed between the cams and the upright, reciprocatory driving members or drivers, the cams being located outside of the furnace body;

Fig. 5 is a horizontal section of the apparatus shown in Fig. 4;

Fig. 6 and Fig. 7 show a driver combined with a receptacle which is interposed between the driver and the lifting cam.

Referring to said drawings, A is the body of the furnace, A^1 is the floor of the furnace, A^2 is foundation masonry supporting the floor. Lengthwise of the furnace are two upright slots extending through the floor and the foundation. In each of said slots is a horizontal shaft, B, bearing cams, B^1. On each of said cams rests a driving member or driver, B^2, which is adapted to be lifted and allowed to descend by gravity during the rotations of the cam. The upper part of each slot, A^3, is shown contracted, in order that the driving members may be relatively thin measuring horizontally and transversely to the slots. Measuring horizontally in the other direction, the driving members are relatively wide, and their upper ends are slanted, the part which is toward the discharge end of the furnace being the lower. The cams are so formed as to allow the entire driving member to descend below the upper face of the floor when the axis of the cam is above the cam shaft, and so that all of the upper end of the driving member will extend above the furnace floor when the long radius of the cam is above the cam shaft. The cams are arranged alternately, one cam having its long radius at one side of the cam shaft and the other having its long radius at the opposite side of the cam shaft. Under this arrangement, one driver extends above the floor while the next forward driver (toward the discharge end of the furnace) is in its lower position—below the furnace floor.

At the receiving end of the furnace, articles which are to be heated are placed upon the floor of the furnace transversely to and across the two lines of drivers. When a pair of drivers rise under any such article, said article slips or rolls forward on the drivers while the drivers move upward. When the article passes out of engagement with that pair of drivers, it is above the next pair of drivers, and when the latter move upward, they drive said article forward as was done by the last preceding pair of drivers. In this manner, the article is driven forward progressively by the series of drivers until the article is discharged from the discharge end of the furnace. The time required by the article in traversing the furnace floor depends upon the length of the furnace and the number of the drivers and the velocity of the cam shafts.

Each of the drivers has a downward extension, B^5, at each side of its cam whereby the drivers are held against movement parallel to the slots, A^3. The side walls of the slots hold the drivers against sidewise movement transversely of the slots. The drivers are to be made of fire brick or metal or other suitable heat-resisting material.

In Figs. 4 and 5, the cam shafts, B, are

located at opposite sides of the furnace and adjacent each cam a lever, C, extends through a slot, C^1, in the foundation, A^2, and is pivoted at C^2, one end of the lever extending beneath the cam and the other end extending beneath and pivoted to one of the drivers. When the cam is rotated, the lever, C, is rocked on the pivot, C^2, whereby the driver is first lifted and then allowed to descend. The cam shafts, B, B, are connected to a common drive shaft, B^3, by miter gears, B^4, for simultaneous driving.

Figs. 6 and 7 illustrate a driver combined with a socket or receptacle. The receptacle rests on a cam, B^1. At each side of the cam, the receptacle has a downward extension, B^8, similar to the downward extensions, B^5, on the driver shown in Figs. 1 and 3. The driver has a stem, B^6, extending into the socket or receptacle. At each side of the driver is a flange, b^2, extending laterally over the upper edge of the receptacle. The receptacle may be regarded as a part of the driver, it being assumed that the driver is composed of an upper and a lower section. By using these two parts or sections, the upper part may be replaced separately when damaged by heat. That course is more economical than replacing the entire structure. Furthermore, when the two parts are used, one may be made of one material and another of another material. For example, the receptacle may be of cast iron while the part, B^2, is made of fire brick. For the treatment of some materials passing through the furnace a high degree of heat is required. In such cases, the upper part of the drivers should be adapted to resist such high heat.

I claim as my invention,

1. In an apparatus of the nature described, a furnace floor having upright slots, a plurality of drivers located in each of said slots in a row parallel to the slot, and means for actuating adjacent drivers in alternation, substantially as described.

2. In an apparatus of the nature described, a furnace floor having upright slots, a plurality of drivers located in each of said slots and having inclined upper faces and being arranged in a row parallel to the slot, and means for actuating adjacent drivers in alternation, substantially as described.

3. In an apparatus of the nature described, a furnace floor having upright slots, a plurality of drivers located in each of said slots in a row parallel to the slot, and cam mechanism for actuating adjacent drivers in alternation, substantially as described.

4. In an apparatus of the nature described, a furnace floor having upright slots, a plurality of drivers located in each of said slots and having inclined upper faces and being arranged in a row parallel to the slot, and cam mechanism for actuating adjacent drivers in alternation, substantially as described.

5. In an apparatus of the nature described, a furnace floor having upright slots, a plurality of drivers located in each of said slots in a row parallel to the slot, and means adjacent each driver for engaging and holding said driver against movement parallel to the slot and imparting up and down movement to the driver, substantially as described.

6. In an apparatus of the nature described, a furnace floor having upright slots, a plurality of drivers located in each of said slots in a row parallel to the slot, and a cam adjacent each driver engaging and holding said driver against movement parallel to the slot and imparting up and down movement to the driver, substantially as described.

7. In an apparatus of the nature described, a furnace floor having upright slots, a plurality of drivers located in each of said slots in a row parallel to the slot and the drivers having their lower parts notched, and means adjacent each driver for engaging in the slot of that driver and imparting up and down movement to the driver, substantially as described.

8. In an apparatus of the nature described, a furnace floor having upright slots, a plurality of drivers located in each of said slots in a row parallel to the slot and the drivers having their lower parts notched, and a cam adjacent each driver for engaging in the slot of that driver and imparting up and down movement to the driver, substantially as described.

9. In an apparatus of the nature described, a furnace floor having upright slots, a plurality of drivers located in each of said slots in a row parallel to the slot, a receptacle for each driver, and means for imparting alternating up and down movement to the receptacles, substantially as described.

10. In an apparatus of the nature described, a furnace floor having upright slots, a plurality of drivers located in each of said slots in a row parallel to the slot, a receptacle for each driver, and cams for imparting alternating up and down movement to the receptacles, substantially as described.

In testimony whereof I have signed my name this 23d day of March, in the year one thousand nine hundred and eighteen.

JAMES V. GITHENS.