

**No. 700,427.**

**Patented May 20, 1902.**

**W. D. KEYES.**

LEER FOR ANNEALING PLATE GLASS.

(Application filed Sept. 4, 1901.)

(No Model.)

**2 Sheets—Sheet 1.**

FIG. 1.

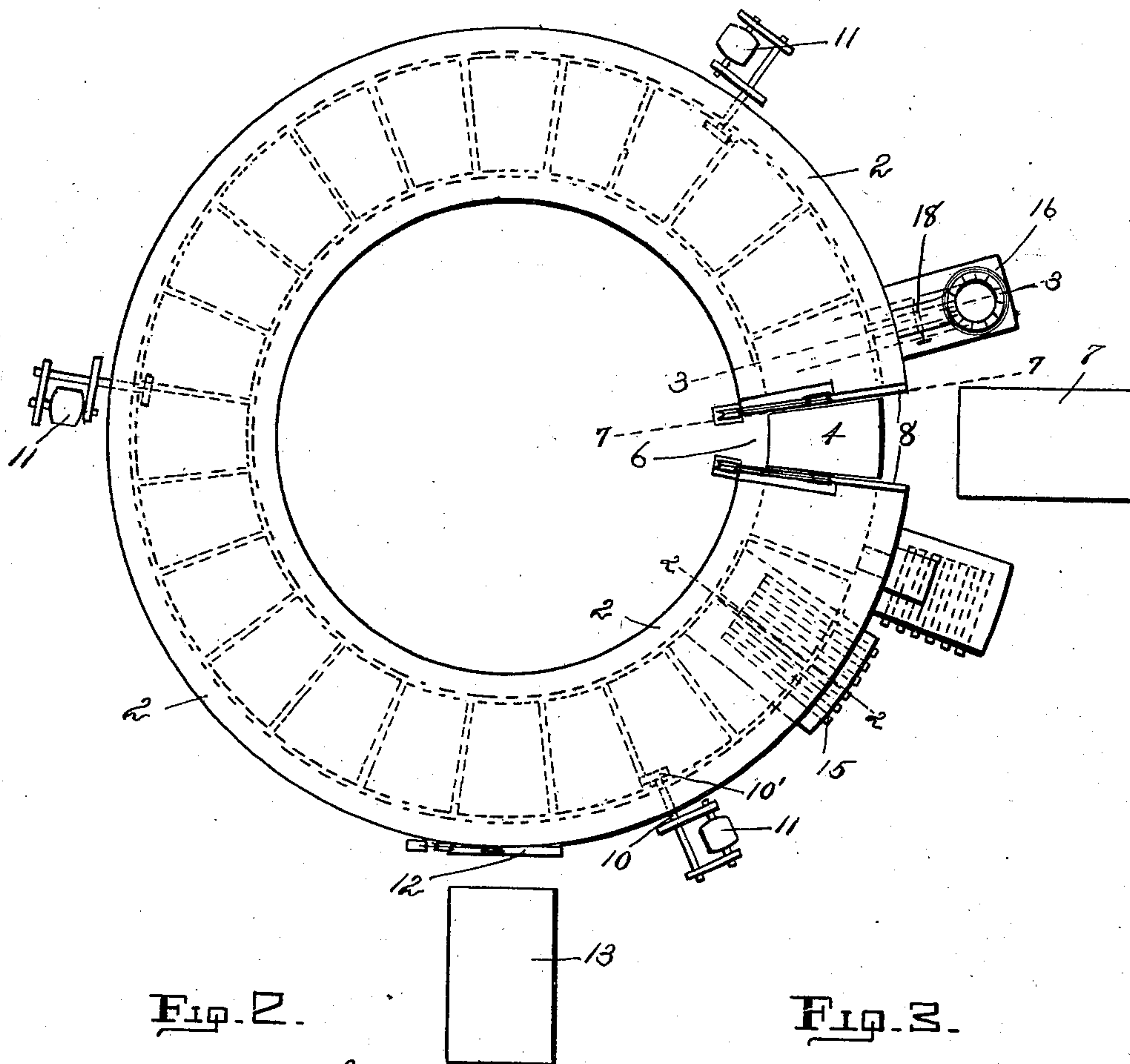


Fig. 2.

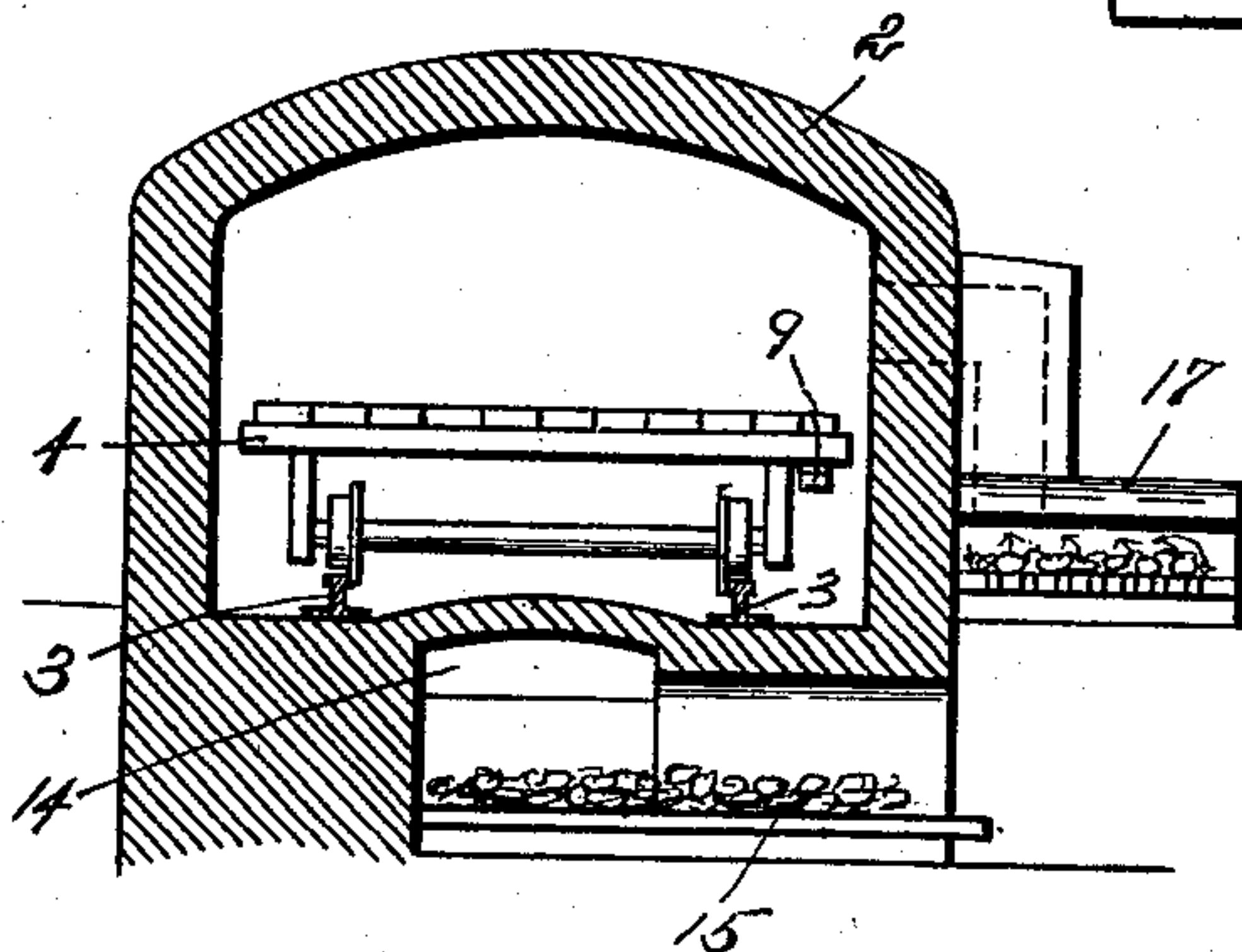
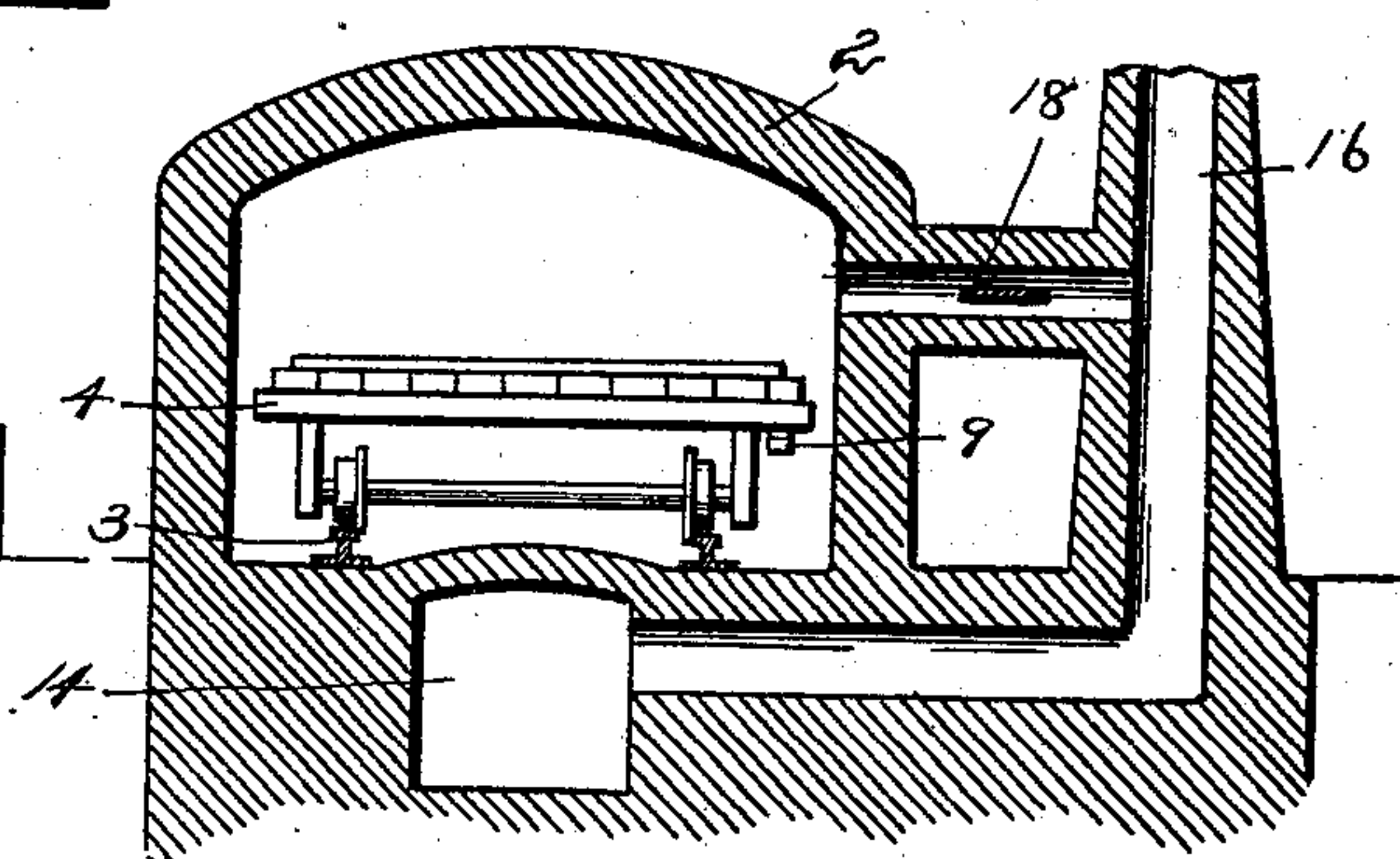


Fig. 2.



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Fig. 4.

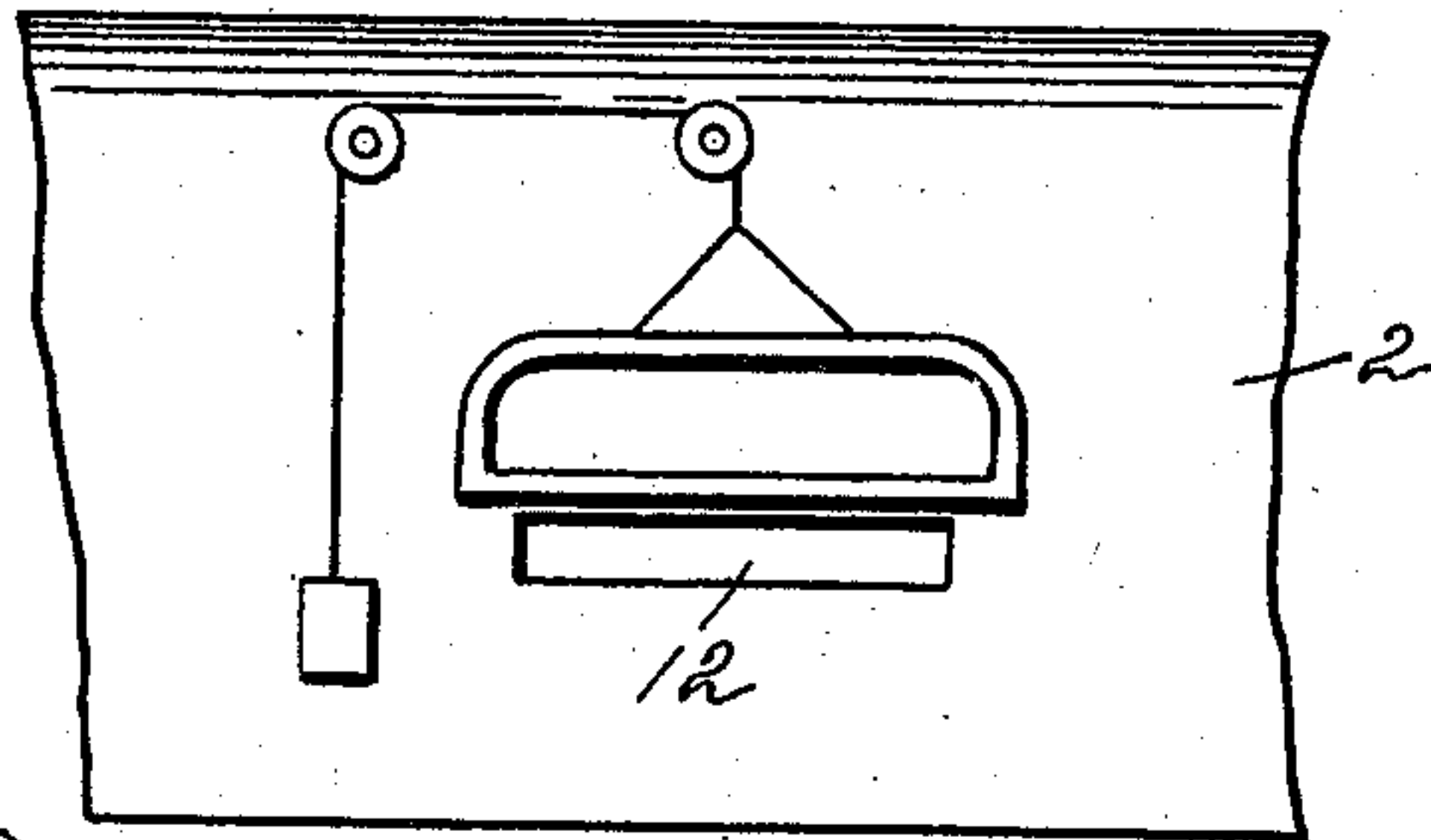


Fig. 5.

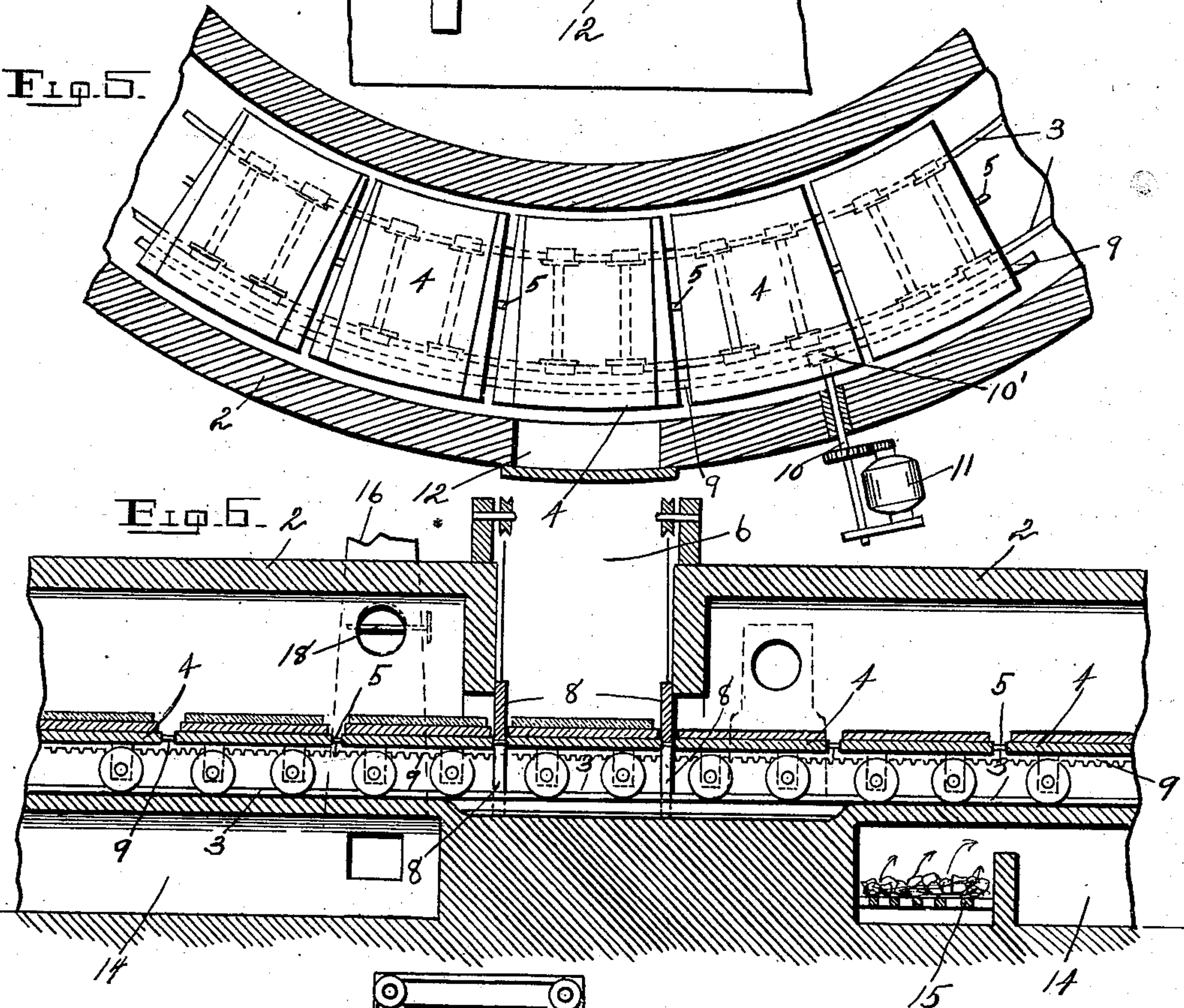
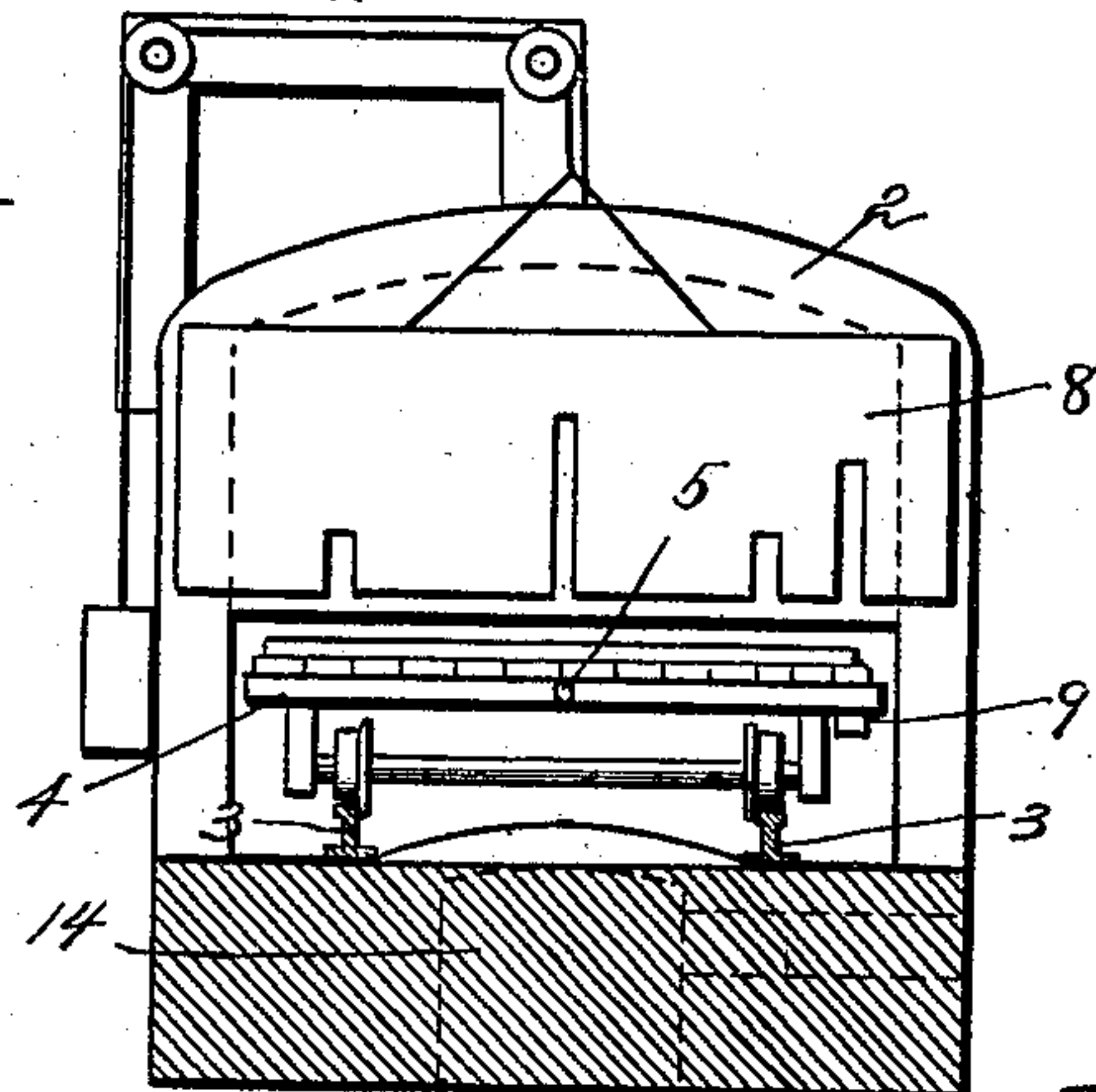


Fig. 7.



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# UNITED STATES PATENT OFFICE.

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## LEER FOR ANNEALING PLATE-GLASS.

SPECIFICATION forming part of Letters Patent No. 700,427, dated May 20, 1902.

Application filed September 4, 1901. Serial No. 74,285. (No model.)

*To all whom it may concern:*

Be it known that I, WASHINGTON D. KEYES, a citizen of the United States, residing at Blairsville, in the county of Indiana and State of Pennsylvania, have invented certain new and useful Improvements in Leers for Annealing Plate-Glass, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to leers for annealing plate-glass, and has particular reference to certain improvements in the construction of a circular or other continuous leer through which the plates are carried on cars from the casting-table to the cutting-table.

15 The invention consists in the novel features of construction and in the combination and arrangement of parts hereinafter fully described and claimed, and illustrated by the accompanying drawings, wherein—

20 Figure 1 is a plan view of a leer constructed in accordance with my invention. Fig. 2 is a cross-sectional view on line 2 2 of Fig. 1, and Fig. 3 is a cross-section taken on line 3 3 of the same figure. Fig. 4 is an elevation of the inlet portion of the leer, and Fig. 5 is a sectional plan view of the same. Fig. 6 is a vertical longitudinal sectional view of the outlet portion. Fig. 7 is a sectional view on line 7 7 of Fig. 1.

30 Referring to the drawings, 2 represents a continuous tunnel, preferably circular in form and provided with tracks 3 on the floor thereof, upon which move the circular or endless series of cars 4, coupled together at 5. The tunnel is closed its entire length, save for interruption 6 of segmental form to correspond to the segmental-shaped cars, which pass there-through progressively, carrying the annealed plates, which are discharged onto cutting-table 7. The opposite ends or terminals of the tunnel at incision 6 are closed, save when the cars are moving, by vertically-moving doors 8, which are so spaced apart and arranged as to drop between the cars, the discharging-car being thus separated while at rest from the adjacent cars to which it is coupled, as shown in Fig. 6. Secured to the under sides of the cars are the rack-sections 9, which form a substantially continuous rack, and engaging the same are pinions 10' on drive-shafts 10, ex-

tending from three or more motors 11, arranged exterior of the leer, and by this means uniform intermittent movement is imparted to the circle of cars. This movement occurs 55 after a freshly-cast plate is moved to position on a car through inlet-opening 12 from casting-table 13, and with doors 8 raised the same movement passes a car to discharging position.

60 Immediately beneath the floor of tunnel 2 is a flue 14. At the inner end of this flue, which is as near as practicable to discharge-opening 6, is grate 15, upon which coke may be burned, or a gas-burner may be provided 65 where gas is available. Flue 14 extends uninterruptedly around the tunnel to a point adjacent discharge 6, where it communicates with stack 16. With this grate and flue the portion of the tunnel between the discharge 6 70 and the casting-table or that part which receives the cars immediately after the glass is discharged therefrom is subjected to the greatest heat, thereby reheating the cars and conditioning them to receive the fresh casts. The 75 temperature of the flue and tunnel reduces gradually between the grate and stack, as required for effectually annealing the plates, and without subjecting them to sudden changes. Adjacent grate 15 is another coke-burning 80 grate 17, which communicates directly with tunnel 2, adjacent inlet 6, circulation being provided by dampered communication 18 between tunnel 2 and stack 16. A gas-burner 85 may be substituted for grate 17, if desired. With this source of heat the upper portions and top surfaces of the cars are thoroughly reheated, ready to receive the freshly-cast plates, and also a further means is provided 90 for maintaining a gradually-reduced temperature in the tunnel as the discharge-opening is approached. With proper manipulation the two grates combine to provide a most effective annealing temperature, the same being 95 highest for reheating the empty cars while passing to charging position and of such gradually-reducing degree as the discharge is approached that the plates emerge perfectly annealed and ready for removal to the cutting-table. 100

The doors 8, which are notched, as shown, to move down over car-couplings 5 and rack



9, effectually close the tunnel-openings at the point of discharge and prevent admission and circulation of cold air. The tunnel is thus substantially tight and the plates fully protected against injurious drafts. As the plates are not disturbed or manipulated in any manner during the annealing process, there is practically no waste.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An improved leer comprising a tunnel having inlet and discharge openings, plate-carrying means within the tunnel, a flue beneath the tunnel-floor, a stack communicating with the tunnel and flue, and means for supplying heat to the tunnel and flue, substantially as shown and described.

2. An improved leer comprising a tunnel having inlet and discharge openings, plate-carrying means within the tunnel, a flue beneath the tunnel-floor, means adjacent the tunnel-inlet opening for supplying heat to the tunnel and flue, and a stack adjacent the tunnel-outlet opening having separate connections with the flue and tunnel, substantially as shown and described.

3. An improved leer comprising a circular tunnel having a transverse opening or interruption forming a discharging-space, the tunnel being provided with an inlet-opening and with heating means, an endless plate-conveyor within the tunnel and traversing the said discharging-space, mechanism for actuating the conveyor, and means for closing the tunnel at opposite ends of the discharging-space with a portion of the conveyor in said space, substantially as shown and described.

4. An improved leer comprising a circular tunnel having a transverse opening or interruption forming a discharging-space, the tunnel being provided with an inlet-opening and with heating means, an endless series of plate-carriers movable in the tunnel, means for actuating the carriers, the length of the said tunnel-discharging space being the same as the length of any one of the carriers, and doors movable between the carriers for closing

ing the tunnel at opposite ends of the discharging-space, substantially as shown and described.

5. An improved leer comprising a circular tunnel having a transverse opening or interruption forming a discharging-space, the tunnel being provided with an inlet-opening and with heating means, an endless series of plate-carriers movable in the tunnel, means for actuating the carriers, and means for closing the tunnel at opposite ends of the discharging-space with the discharging-carrier intermediate the closing means, substantially as shown and described.

6. An improved leer comprising a circular tunnel having an inlet-opening, an endless series of segmental-shaped plate-carriers movable in the tunnel, means for actuating the carriers, means for heating the tunnel, the tunnel being formed with a vertical opening or interruption corresponding in outline to any one of the carriers, and doors movable between the carriers for closing the tunnel at opposite ends of the said discharging-opening, substantially as shown and described.

7. An improved leer comprising a circular tunnel formed with an inlet-opening, an endless series of segmental-shaped carriers movable in the tunnel, means for actuating the carriers, the tunnel being formed with a transverse segmental-shaped opening or interruption corresponding in size to any one of the carriers, doors at opposite ends of said opening for closing the tunnel with a carrier positioned within said space for discharging, a horizontal flue beneath the tunnel-floor having its inlet end between the tunnel inlet and outlet openings, a stack adjacent the tunnel-outlet with which the tunnel and flue communicate, and means for supplying heat to the flue and tunnel, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

WASHINGTON D. KEYES.

Witnesses:

J. M. NESBIT,  
ALEX. S. MABON.