

Nov. 18 , 1924.

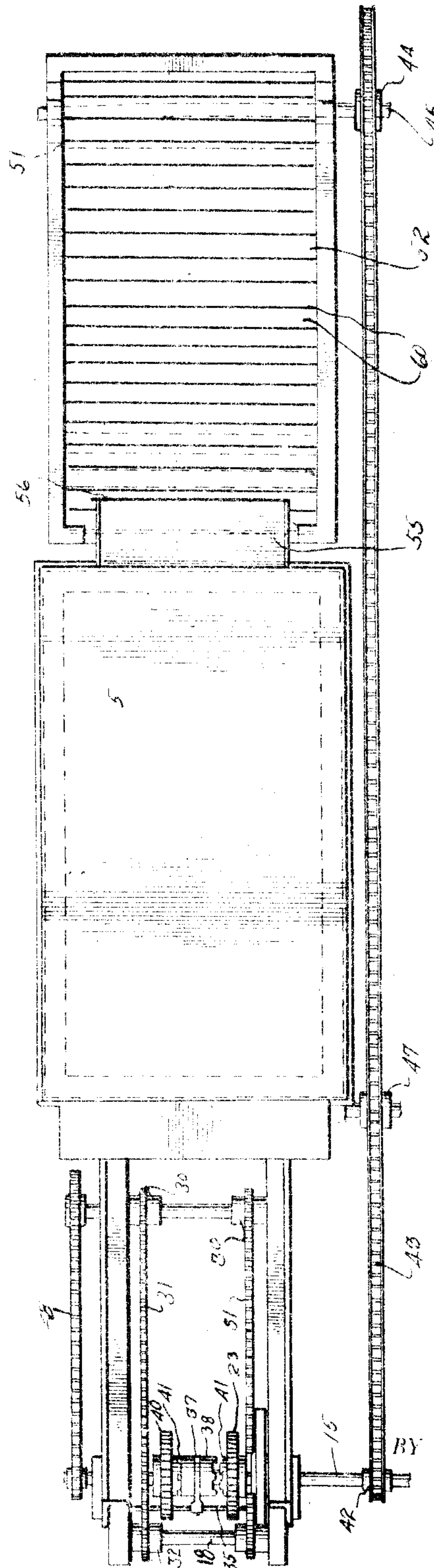
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J. W. ANDERSON

CONTINUOUS FURNACE

Filed June 25 , 1923

3 Sheets-Sheet 1



*Fig. 1*

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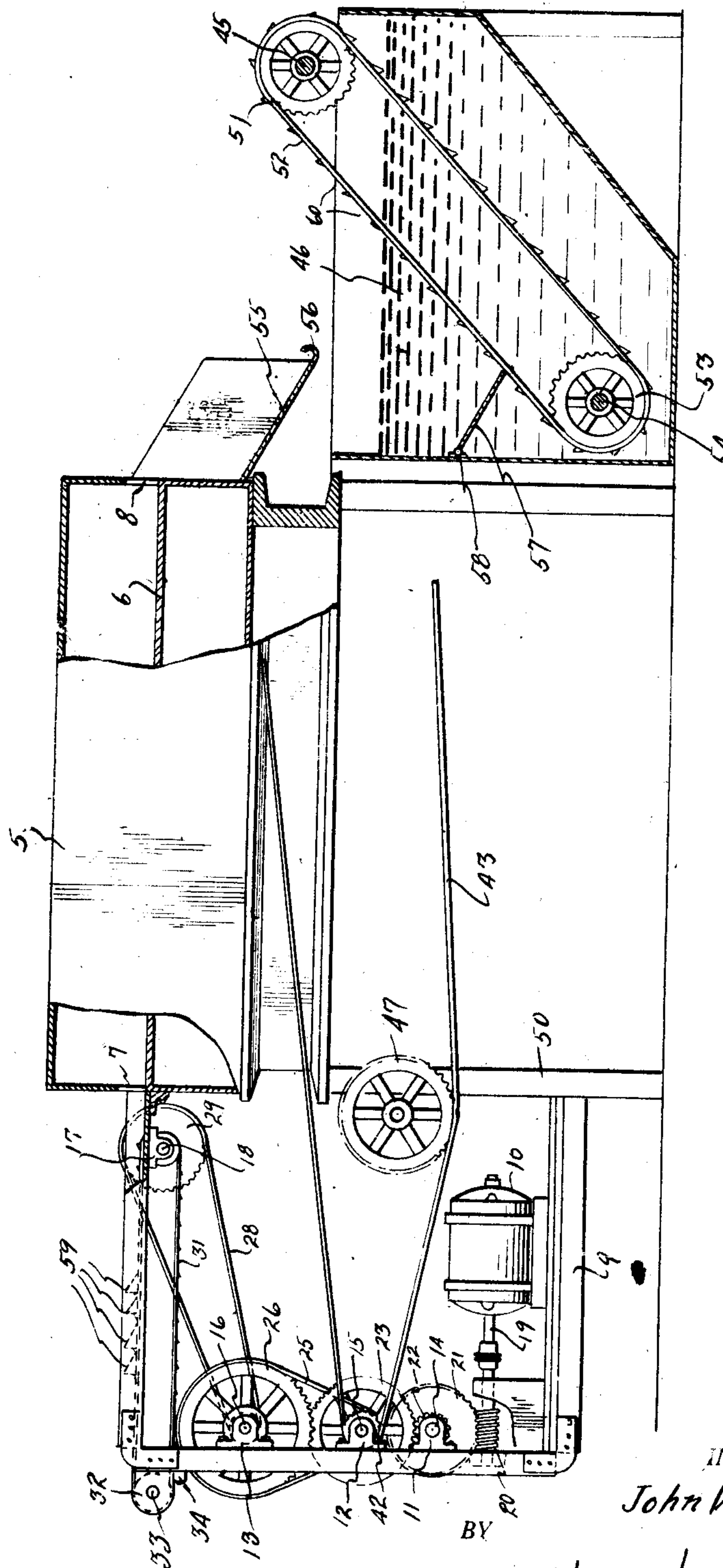


Fig. 2

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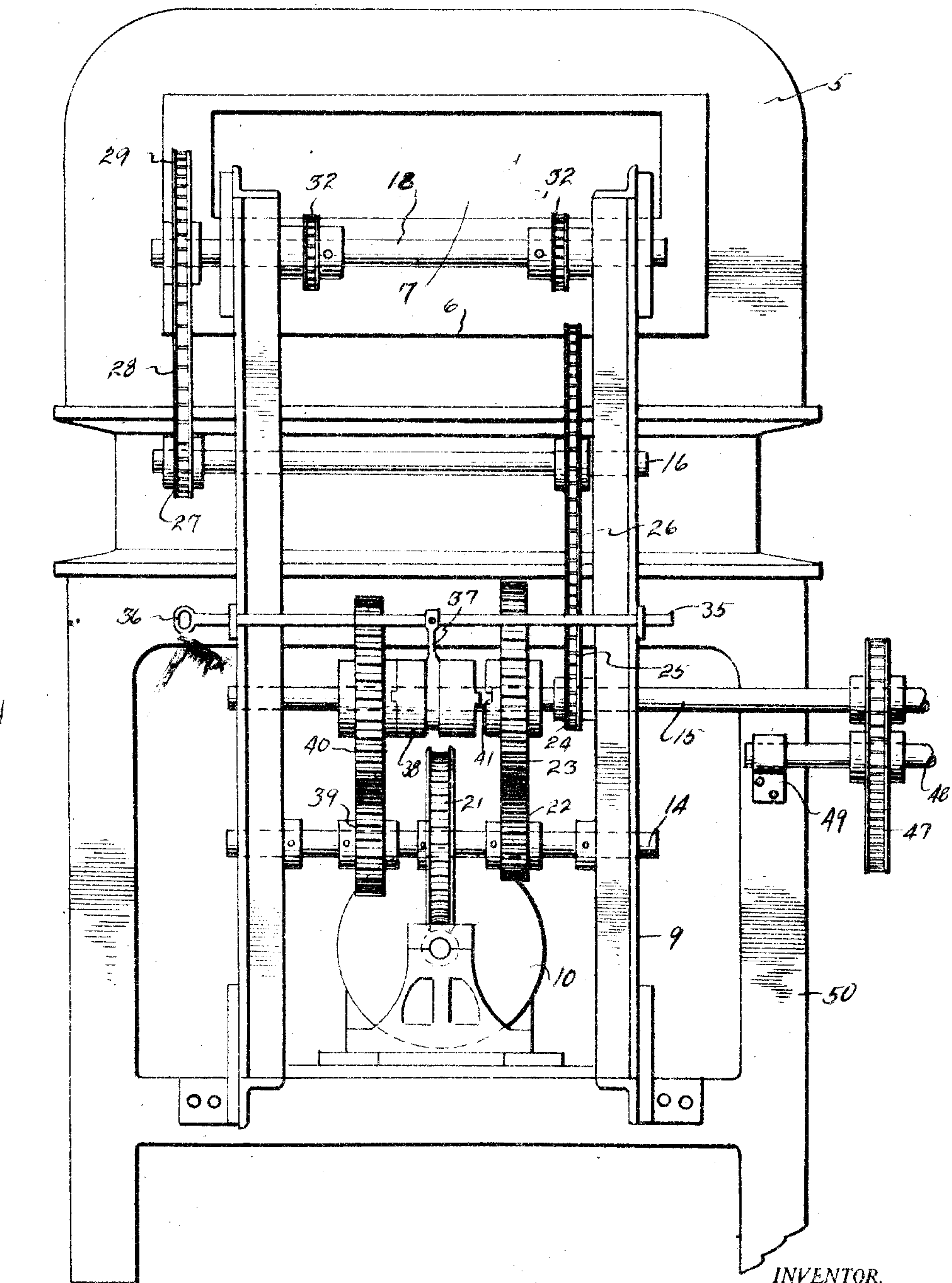
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3 Sheets-Sheet 1



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## UNITED STATES PATENT OFFICE.

JOHN W. ANDERSON, OF NEWCASTLE, INDIANA.

CONTINUOUS FURNACE.

Application filed June 25, 1923. Serial No. 647,530.

*To all whom it may concern:*

Be it known that I, JOHN W. ANDERSON, a citizen of the United States, and resident of Newcastle, in the county of Henry and State of Indiana, have invented certain new and useful Improvements in Continuous Furnaces, of which the following is a specification, reference being had to the accompanying drawings.

It is the present day practice when annealing or otherwise heat treating small metal objects to throw them into a furnace and allow them to remain therein for a predetermined time, then open the door of the furnace and rake the objects out, at the same time throwing in another batch to be treated. This process, of course requires careful attendance, as well as a considerable loss of heat when the furnace is open. It is impracticable to dispose a continuous conveyor within the furnace for carrying the objects therethrough because of the excessive heat which is present in the furnace and which would destroy the conveyor.

It is one of the primary objects of my invention to provide a furnace adapted to receive objects of the above nature and means whereby such objects may be carried continuously through the furnace and removed therefrom so that the only attendance necessary is that of placing the objects on a conveyor adapted to carry them to the furnace.

It is a further object of my invention to provide means in connection with the aforesaid means for oil tempering the devices and removing them from the oil tempering bath without the requirement of manual effort.

It is a still further object to provide such combined means of simple and economical construction, one wherein practically no manual attention need be given.

With these and other objects in view, my invention consists in the arrangement, combination and construction of the various parts of my improved device as described in the specification, claimed in my claims and shown in the accompanying drawings, in which:

Fig. 1 is a top or plan view of my improved device.

Fig. 2 is a side elevation thereof, and

Fig. 3 is an end elevation taken from the receiving end of the furnace.

I have shown generally a furnace 5 having

a bed 6 extending therethrough, a receiving aperture 7 at one end thereof and a discharging aperture 8 at the other end thereof. Disposed adjacent the receiving end of the furnace is a frame indicated generally as 9 upon which an electrical motor 10 is adapted to be positioned. Secured on the vertical portion of the frame are a plurality of brackets 11, 12 and 13 in which shafts 14, 15 and 16 are respectively journaled. The top horizontal arm of the frame 9 is provided with brackets 17 in which a shaft 18 is journaled.

The electrical motor 10 is provided with a shaft 19 having a worm 20 on the end thereof adapted to mesh with the worm gear 21 on the shaft 14. A smaller gear 22 is also positioned on the shaft 14 and adapted to mesh with a gear 23 positioned on the shaft 15. Also positioned on the shaft 15 is a sprocket 24 adapted to be connected by a chain or belt 25 with a sprocket 26 provided on the shaft 16. Also provided on the shaft 16 is a sprocket 27 adapted to be connected by a belt or chain 28 with a sprocket 29 provided on the shaft 18. A pair of sprockets 30 are also provided on the shaft 18 and adapted to be connected by an endless conveyor chain or belt 31 with a pair of sprockets 32 positioned on a shaft 33 journaled in brackets 34 secured to the vertical portion of the frame 9.

Thus when an electrical motor is started, motion will be transmitted through the train of gears to the endless conveyor 31, which endless conveyor has its one end disposed adjacent the receiving end or mouth 7 of the furnace 5. The speed at which the conveyor will operate can, of course, be controlled by varying the size of the gears in the train but I have provided one means whereby this speed can be quickly and easily changed which consists of disposing a rod 35 having a handle 36 on one end thereof across the frame work of the frame 9 and having secured intermediate its ends an arm or lever 37 attached to a two sided jaw or clutch 38 rigidly and slidably mounted on the shaft 15. I have also disposed a gear 39 on the shaft 14 and a gear 40 on the shaft 15, in similar positions to the gears 22 and 23, but of different sizes than the gears 22 and 23. Both the gears 23 and 40 are loosely mounted upon the shaft 15. Thus by pulling on the handle 36, the clutch 38 will be made to engage in the notch 41 of



the gear 40 and the speed of the shaft 15 regulated by the gears 39 and 40. By pushing on the handle 36, the clutch 38 will become disengaged from the gear 40 and the opposite face thereof will engage in a similar notch 41 in the gear 23 and the speed of the shaft 15 regulated by the gears 22 and 23.

The shaft 15 is extended outwardly beyond the frame 9 and has secured thereon a sprocket 42 which is connected by means of a chain or belt 43 with a sprocket 44 disposed on the shaft 45 mounted at the forward end of an oil bath 46 beneath the discharge end of the furnace 5. An idler gear 47 is mounted on a shaft 48 secured as at 49 to a leg 50 forming the support for the furnace.

The shaft 45 is provided with sprockets 51 upon which a conveyor 52 is adapted to run, said conveyor being disposed at its other end around sprockets 53 disposed on a shaft 54 within the oil bath 46.

A chute 55 is disposed beneath the discharge opening 8 of the furnace so that objects coming therefrom will be guided and caused to fall into the bath 46. This chute 55 is provided at its lower end with a number of hooked prongs 56 which are adapted to catch the containers in which the objects to be heat treated are carried through the furnace but at the same time permit the objects themselves to fall into the oil bath.

When the objects fall into the bath they will be prevented from going to the bottom thereof by the plate 57 which has one end thereof resting on the conveyor belt 52 and the other end thereof pivoted at 58 to the side of the bath. Thus the objects will strike the plate 57 and the conveyor belt 52 and will then be carried upwardly and out of the bath by the conveyor belt 52 without manual attention.

In the practical operation of my improved device, the objects to be heat treated may be placed in trays or containers 59 which may be of any desired shape to accommodate the articles to be treated but it should be, as nearly as possible, open so as to permit heat to pass uninterrupted to the objects. These containers 59 may then be placed upon the conveyor 31 by which they will be carried to the receiving aperture 7 of the furnace. Having arrived at this point, the continuous line of containers, one behind the other, will cause those containers which have arrived at the mouth of the furnace to be pushed into the furnace and as the conveyor 31 continues to rotate, they will be pushed continuously through the furnace on the bed 6 thereof until they arrive at the discharge opening 8 of the furnace. They will then fall by gravity down the chute 55 and the objects in the container will be dislodged therefrom by the force of falling and

will drop into the oil or other bath 46 where they will be caught by the members 60 on the conveyor and carried up and out of the bath. A suitable container may be placed beneath the end of the conveyor 52 on the outside of the bath 46 so as to catch the objects when they are discharged from the conveyor 52.

The trays or containers 59 which will have been caught by the hooked prongs 56 of the chute 55 may be removed therefrom and reused for other objects to be heat treated.

It will thus be seen that from the time the objects are placed on the conveyor belt 31, no manual attention whatsoever is needed in the proper treating of the same. All the attention that need be given is that of placing the objects on the conveyor leading to the furnace and that of carrying the objects away after they have been treated.

Furthermore, the entire apparatus is interconnected and operated by a single source of power.

Any number of furnaces may be operated on the same plan and from the same source of power by merely extending the shaft 15 laterally and having a conveyor system on the additional furnaces adapted to be operated through the shaft 15 by means of connections on the other furnaces similar to the sprocket 26 shown in the instant one.

It is obvious that various changes may be made in the arrangement, combination and construction of the various parts of my improved device without departing from the spirit of my invention and it is my intention to cover by my claims such changes as may be reasonably included within the scope thereof.

What I claim is:

1. A device of the class described, comprising a furnace having a receiving and a discharging end, a conveyor disposed adjacent the receiving end of said furnace and externally thereof adapted to carry objects to said furnace and to force them through the same and out of the discharge end thereof.

2. A device of the class described, comprising a furnace having a receiving and a discharging end, a conveyor disposed adjacent the receiving end of said furnace and externally thereof, containers having objects therein adapted to be carried on said conveyor to the said receiving end of the furnace and to be forced into and through said furnace by the force of other containers on said conveyor.

3. A device of the class described, comprising a furnace having a receiving and a discharging end, a conveyor disposed adjacent the receiving end of said furnace and externally thereof adapted to carry objects to said furnace and to force them through the same and out of the discharge end thereof, and a bath disposed below said discharge



end to catch said objects after having been forced therethrough.

4. A device of the class described, comprising a furnace having a receiving and a discharging end, a conveyor disposed adjacent the receiving end of said furnace and externally thereof, containers having objects therein adapted to be carried on said conveyor to the said receiving end of the furnace and to be forced into and through said furnace by the force of other containers on said conveyor and a bath disposed below said discharge end to catch said objects after having been forced therethrough.

5. A device of the class described, comprising a furnace having a receiving and a discharging end, a conveyor disposed adjacent the receiving end of said furnace and externally thereof, containers having objects therein adapted to be carried on said conveyor to the said receiving end of the furnace and to be forced into and through said furnace by the force of other containers on said conveyor, a bath disposed below said discharge end to catch said objects after having been forced therethrough and means intermediate said end and said bath for catching said containers.

6. A device of the class described, comprising a furnace having a receiving and a discharging end, a conveyor disposed adjacent the receiving end of said furnace and externally thereof adapted to carry objects to said furnace and to force them through the same and out of the discharge end thereof, and a bath disposed below said discharge end to catch said objects after having been forced therethrough, and a conveyor in said bath adapted to automatically carry said ob-

jects out of the same, both said first conveyor and said second conveyor being interconnected and operated by the same source of power.

7. A device of the class described, comprising a furnace having a receiving and a discharging end, a conveyor disposed adjacent the receiving end of said furnace and externally thereof, containers having objects therein adapted to be carried on said conveyor to the said receiving end of the furnace and to be forced into and through said furnace by the force of other containers on said conveyor and a bath disposed below said discharge end to catch said objects after having been forced therethrough, and a conveyor in said bath adapted to automatically carry said objects out of the same, both said first conveyor and said second conveyor being interconnected and operated by the same source of power.

8. A device of the class described, comprising a furnace having a receiving and a discharging end, a conveyor disposed adjacent the receiving end of said furnace and externally thereof, containers having objects therein adapted to be carried on said conveyor to the said receiving end of the furnace and to be forced into and through said furnace by the force of other containers on said conveyor, a bath disposed below said discharge end to catch said objects after having been forced therethrough and means intermediate said end and said bath for catching said containers, and a conveyor in said bath adapted to automatically carry said objects out of the same, both said first conveyor and said second conveyor being interconnected and operated by the same source of power.

JOHN W. ANDERSON.