

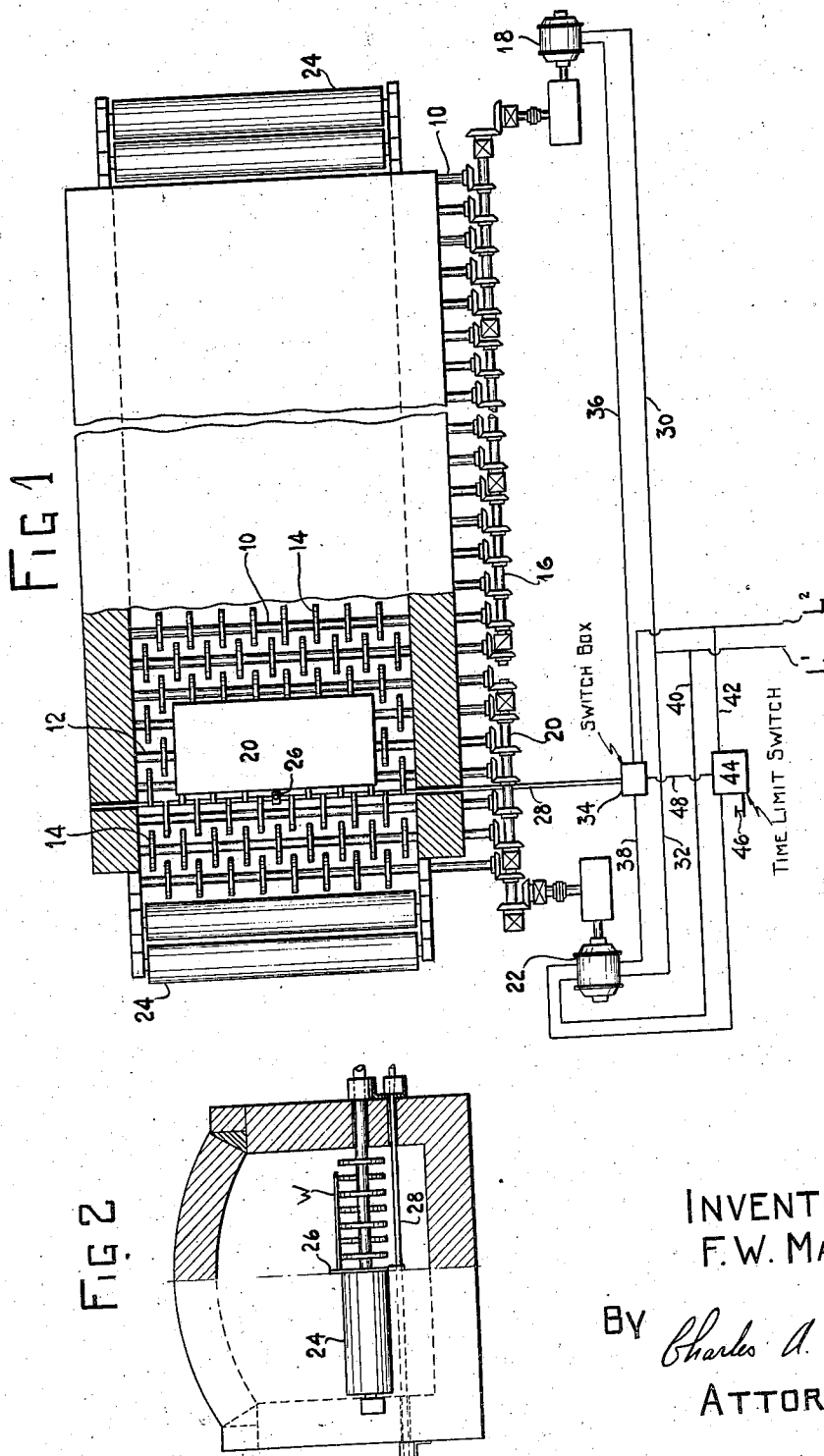
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F. W. MANKER

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CONVEYER SYSTEM FOR HEAT TREATING FURNACES

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INVENTOR
F. W. MANKER.

BY *Charles A. Lind*
ATTORNEY

UNITED STATES PATENT OFFICE

FORREST W. MANKER, OF TOLEDO, OHIO, ASSIGNOR TO THE SURFACE COMBUSTION COMPANY, INC., OF TOLEDO, OHIO, A CORPORATION OF NEW YORK

CONVEYER SYSTEM FOR HEAT-TREATING FURNACES

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This invention relates to improvements in conveying mechanism for heat-treating furnaces of the type wherein relatively flat work such as tin packs may be heated while being passed therethrough.

It is an object of the invention to provide conveyer mechanism and controlling means therefor of such character that the work on arriving at a position near the exit end of the furnace will automatically actuate instrumentalities adapted to stop the conveyer to prevent the latter from ejecting the work from the furnace and of such character that the operator when ready to receive the work may actuate other instrumentalities to cause the work to be quickly ejected from the furnace.

In accordance with this invention the conveyer is a bed of upright work-supporting disks mounted on shafts which extend crosswise of the furnace, the shafts being driven in any suitable manner. When the work reaches a position near the exit end of the furnace it actuates a trigger mechanism adapted to stop the conveyer and thus to prevent the conveyer from ejecting the work from the furnace until such time as the conveyer is actuated by other mechanism under control of the furnace operator. When the work is to be ejected from the furnace, that group of disks and shafts adjacent the furnace exit is caused to rotate at a relatively high speed in order to quickly pass the work through the furnace exit, said group, however, after the work has been ejected as aforesaid, again rotating at the same speed as the other part of the conveyer.

The work while being brought up to heat is, of course, moved through the furnace relatively slowly. If the work were just as slowly ejected from the furnace, it would cool off very materially before the work as a whole could be ejected. Moreover, if the operator is not ready to receive the work when the conveyer, if not otherwise controlled, would eject the work, the work will of course cool off and therefore not be in proper condition for rolling. It will therefore be seen that the present invention provides a simple and practical conveyer system for the proper handling of work

such as tin packs. It will, however, be understood that while the invention finds its principal utility where relatively thin flat work such as tin packs is to be heated it is not limited to such use.

For a more complete understanding of the invention reference is made to the detailed description taken in connection with the accompanying drawing.

In the drawings, Fig. 1 is a schematic plan and sectional view of a furnace provided with a disk type conveyer and showing in diagrammatic form a controlling system for operating the conveyer in accordance with my invention, and Fig. 2 is in part a vertical section and end elevation of the furnace shown in Fig. 1.

The furnace is of tunnel type and has openings at both ends through which the work may enter and leave the furnace, respectively. The furnace is heated by any suitable means (not shown). Extending crosswise of the furnace in a common plane are two sets of driven shafts 10 and 12 on which are non-rotatably secured work-supporting disks 14, the work being shown at W. The shafts 10 are driven in unison by a line shaft 16 which in turn is driven by a single speed motor 18 through suitable gearing. The shafts 12 are driven by a line shaft 20 which in turn is driven by a selective two speed motor 22 through suitable gearing. One or more of the shafts 12 may be positioned outside of the furnace to insure complete delivery of the work from the furnace. Rollers 24 adjacent the outer ends of the furnace may be provided for supporting the work prior to its introduction into and delivery from the furnace, respectively. Disposed within the furnace adjacent the outlet end thereof and in the path of travel of the work is an arm 26 which is secured to a shaft 28 suitably mounted crosswise of the furnace either above or below the disks 14. Upon the arm being struck by the advancing work the shaft 28 is given a partial rotation whereupon the conveyer as a whole comes to a stop before the work has been ejected from the furnace.

Any suitable instrumentalities may be actuated by the shaft for stopping the con-

veyer. For purpose of illustrating the invention the two sets of disk shafts 10 and 12 are assumed to be motor driven by the individual motors 18 and 22, the first of which is a single speed motor and the other a two speed motor. The line wires are indicated at L¹, L². Leading from the line wire L¹ to motors 18 and 22 are wires 30 and 32 respectively. Line wire L² enters a switch box 34 from whence wires 36 and 38 lead to motors 18 and 22 respectively. The arm or trigger shaft 28 enters switch box 34 and by appropriate mechanism breaks the circuit from line wire L² to both motors 18 and 22 when the arm 26 of the shaft is struck by the oncoming work. Prior to the circuit being broken as said, the motors rotate at such speed as to drive the two sets of shafts 10 and 12 at the same rate of speed. The conveyer shafts being stopped as aforesaid, the work remains in the furnace adjacent the outlet end thereof.

When the furnace operator is ready to receive the work he actuates mechanism which will cause the group of shafts 12 to rotate independently of the shafts 10 and at a relatively high rate of speed in order that the work may be quickly ejected from the furnace. Said mechanism may take any suitable form, a simple form being diagrammatically illustrated in the drawing. As previously stated motor 22 is a two speed motor. The high speed circuit includes wire 40, 42 one of which as 42 passes through a time limit switch generally indicated at 44. Associated with this switch is a treadle or the like 46 for closing the circuit wire 42 which when closed will allow motor 22 to operate the shafts 12 at high speed with consequent delivery of the work from the furnace. After an appropriate time limit, the line wire L² leading to switch box is closed by appropriate mechanism including for example an appropriate electrical connection 48 leading from switch 44 to switch 34, the motor 22 being then disconnected from its high speed circuit. The conveyer as a whole may then function as before until another piece of work strikes the trigger arm 26 whereupon the cycle of operations is repeated as aforesaid.

It will be understood that the instant layout of the conveyer controlling mechanism is merely illustrative of any suitable mechanism for stopping the conveyer when the work reaches a position adjacent the outlet end of the furnace and subsequently speeding up a portion of the conveyer to eject the work from the furnace.

What is claimed is:

1. In a heat-treating furnace, the combination of a bed of revoluble members adapted to support the work to be heated, means for rotating said members to move the work from one end of the furnace toward the other,

means actuated by the moving work when it reaches a predetermined position adjacent the exit end of the furnace for stopping the rotation of said members, and means for driving a segregated group of said members adjacent the furnace exit at a relatively high speed to eject the work from the furnace.

2. In a heat-treating furnace, the combination of a bed of revoluble members adapted to support the work to be heated, means for rotating said members to move the work from one end of the furnace toward the other, means actuated by the moving work when it reaches a predetermined position adjacent the exit end of the furnace for stopping the rotation of said members, and means for driving a segregated group of said members adjacent the furnace exit at a relatively high speed to eject the work from the furnace, and means for reestablishing connection between said group and the other members for simultaneous rotation after the work has been ejected from the furnace as aforesaid.

3. In a heat-treating furnace, the combination of a bed provided with two sets of revoluble members adapted to support the work to be heated, a low speed motor connected with the first set, a two speed motor connected with the second set, with its low speed corresponding to the speed of the first motor, means for simultaneously effecting the operation of the first motor and the low speed operation of the second motor, means actuated by the moving work when it reaches a predetermined position adjacent the exit end of the furnace to stop both motors, and means for subsequently effecting operation of the second motor alone at high speed to eject the work from the furnace.

4. In a heat-treating furnace, the combination of a bed provided with two sets of revoluble members adapted to support the work to be heated, a low speed motor connected with the first set, a two speed motor connected with the second set, with its low speed corresponding to the speed of the first motor, means for simultaneously effecting the operation of the first motor and the low speed operation of the second motor, means actuated by the moving work when it reaches a predetermined position adjacent the exit end of the furnace to stop both motors, means for subsequently effecting operation of the second motor alone at high speed to eject the work from the furnace, and means for automatically restoring the initial low speed operation of both motors after a predetermined high speed operation of the second motor.

In testimony whereof I affix my signature.

FORREST W. MANKER.