May 2, 1933. R. E. TALLEY 1,906,659

CONVEYER MECHANISM

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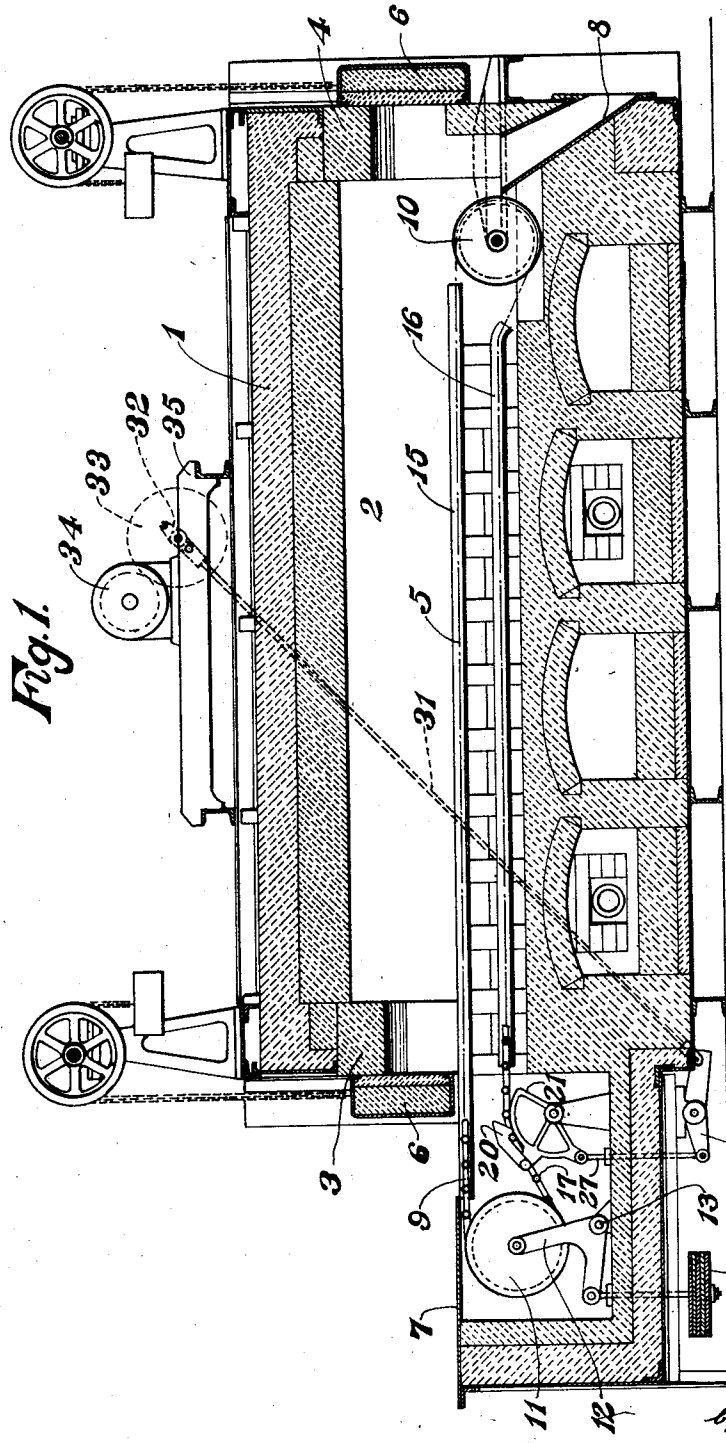


Fig. 1.

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Fig. 2.

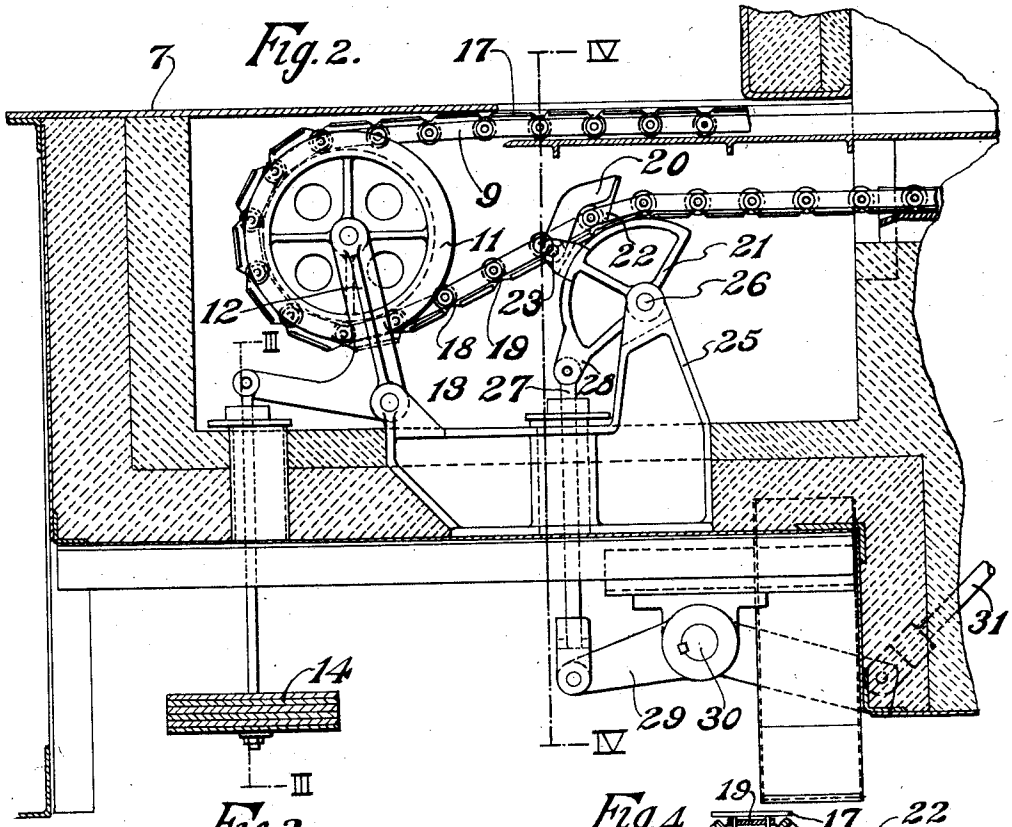


Fig. 3.

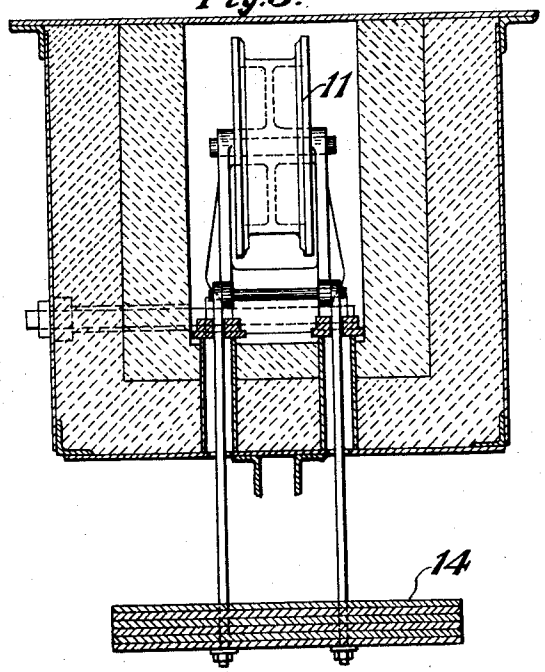
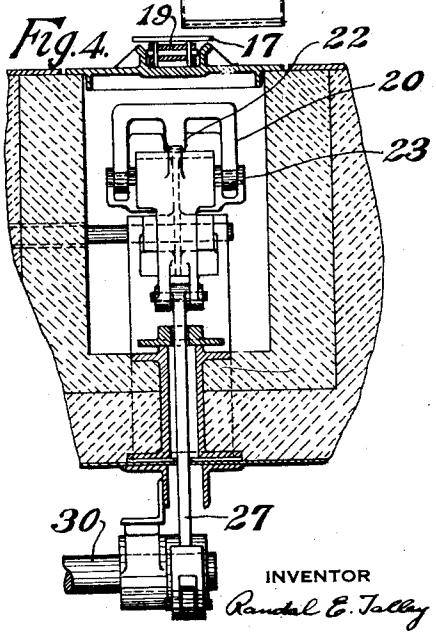


Fig. 4.



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Patented May 2, 1933 1,906,659

UNITED STATES PATENT OFFICE

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CONVEYER MECHANISM

Application filed February 18, 1931. Serial No. 516,612.

This invention relates to conveyer mechanism, more particularly to conveyers of the endless chain type adapted especially for use in industrial heating furnaces.

It is among the objects of this invention to provide conveyer mechanism in which the ware-bearing strand shall be adapted for positive intermittent movement and in which the conveyer actuating mechanism is adapted to advance the conveyer a predetermined amount independent of variations in expansion of the conveyer links.

When conveyers of the endless chain type are employed in industrial heating furnaces, they are subjected to variations in length due to expansion of the links when subjected to the high temperature of the furnace, and on this account a sprocket wheel conveyer drive is unsatisfactory due to the variations in the pitch of the links by the expansion aforesaid.

Other methods of actuating the conveyer by employing tension rollers or the like for frictional contact with a driving drum are similarly unsatisfactory and cause considerable difficulty in operation.

In accordance with the present invention, it is proposed to employ a drive mechanism which is positive in its action and which is adapted to engage the successive links of the conveyer in a firm and positive grip to advance the same in the direction of its travel.

The nature of the apparatus will become more apparent from a consideration of the accompanying drawings constituting a part hereof and in which like reference characters designate like parts, and in which:

Figure 1 is a longitudinal sectional view of a heating furnace and conveyer mechanism embodying the principles of this invention;

Figure 2 an enlarged detail of the tension and actuating mechanisms at the charging end of the furnace;

Figure 3 a cross sectional view partially in elevation of the tension device taken along the line III—III, Figure 2; and Figure 4 a similar view of the actuating mechanism taken along the line IV—IV, Figure 2.

With reference to Figure 1 of the drawings, the structure therein illustrated comprises top, side and end walls 1, 2, 3 and 4, respectively, forming a heating chamber or muffle as the case may be, in which is disposed a conveyer mechanism generally designated at 5. End walls 3 and 4 are provided with doors 6 and a charging platform 7 is provided on one end of the furnace for receiving the work to be conveyed therethrough. The discharge end of the furnace is provided with a chute 8 through which the material drops in its exit from the furnace.

The conveyer mechanism 5 comprises an endless chain 9 supported at its ends on sheave wheels 10 and 11, the wheels 10 being in fixed position adjacent the chute 8 and wheel 11 being mounted on a lever 12 which is pivoted at 13 and an arm of which is provided with a counterweight 14 to urge the lever in a direction to force the wheel 11 away from the wheels 10, thereby applying a tension to the conveyer chain 9.

The conveyer chain 9 is adapted to travel in channels 15 and 16 on which the links are supported by their rollers in passing through the furnace and in their return to the charging end of the furnace. As shown in Figures 2 and 4, the links are provided with aprons 17 which constitute work-supporting surfaces on which the articles to be treated are supported in their passage through the furnace, these aprons being cut away at 18, Figure 2, so that they can freely pass around the wheels 10 and 11 without interfering with each other.

The links are provided with rollers 19 which cooperate with a pawl 20 of a rocker 21, they being successively engaged by the pawl in its rocking movement to advance the conveyer through the furnace.

To this end the pawl member 20 is provided with a hook 22 which envelops the rollers 19 to provide maximum contact therewith and the pawl is pivoted at 23 to a lug provided on the rocker 21 to provide freedom of movement of the pawl as it passes over the links prior to its engagement with the rollers 19.

The rocker 21 is supported on a bracket

25, it being pivotally mounted thereon by trunnions 26. A link 27 is pivotally connected to a lug 28 on the rocker and to a lever 29 supported on the rocker shaft 30 underneath the forward end of the furnace, the angular movement of which subjects the rocker 21 to an oscillating motion which causes the pawl 20 to traverse the links until it drops into engagement between a pair of rollers where it will cause the chain to be advanced on the return movement of the rocker 21.

The lever 29 is actuated through a link 31 connected to a crank 32 of a gear mechanism, the crank being preferably connected to a speed reduction mechanism 33 which is driven by a motor 34 to obtain any desired speed of the oscillating mechanism, the gear and motor mechanisms being mounted on a support 35 on the roof 1 of the furnace.

The operation of the furnace and its conveying mechanism is briefly as follows: The articles to be treated in the furnace chamber are loaded upon platform 7 from which they are pushed on the aprons 17 of the endless conveyer 9. Conveyer 9 is actuated to convey the articles through the furnace as follows: the link 31 which is connected at one end to a crank of the drive mechanism, is subjected to reciprocating movement which causes lever 29 and rocker 21 to oscillate. The shaped rocker 21 may be considerably above the line of contact of the return strand of the conveyer with the bottom of the wheel 11 to ensure intimate contact of the links with the arcuate surface of the rocker. The pawl 20 which is pivotally mounted on rocker 21 at 23 is subjected to angular movement with movement of rocker 21 and the pawl passes over rollers 19 when moving in a clockwise direction and engages the rollers 19 when moving in the opposite direction. The pawl 20 in its clockwise movement drops between successive rollers of the conveyer and when movement of the rocker 21 is reversed, the hook portion 22 of the pawl engages the roller 19 and pulls the chain in a forward direction, i. e., toward the sheave wheel 11.

In this manner the work charged on the aprons 17 of the conveyer is caused to travel through the heating chamber at a uniform rate to provide a predetermined heating cycle for its heat treatment. As the work passes around the wheel 10 it falls into the chute 8 and is discharged from the furnace.

It is immaterial whether the chain 9 is subject to expansion within the furnace since the pawl 20 has ample clearance between successive rollers to fall into place regardless of the position of the rollers, and the pawl will advance the conveyer an amount equal to the spacing of the rollers for each rocking movement of the member 21. Tension on the chain 9 can be regulated through adjustment of the weights 14.

It is evident from the foregoing description of this invention that conveyer mechanisms made in accordance therewith provide positive means for advancing work through a furnace chamber without interference caused by thermal characteristics of the conveyer structure. It is to be noted that in practice it is desirable to employ two, or more, chains in transversely spaced relation to support axles, billets, sheets, or pans and the like, but where two or more of such conveyers are employed, the operation will be the same as described. Pans may be attached to a pair of chains for the treatment of small parts.

Although one embodiment of the invention has been herein illustrated and described, it will be evident to those skilled in the art that various modifications may be made in the details of construction without departing from the principles herein set forth.

I claim:

1. The combination with an endless chain conveyer, of a support extending the full length of the ware bearing strand of said conveyer, mechanism for engaging the successive links of said conveyer comprising a segment shape rocker in constant engagement with said links and a pawl pivotally mounted on said rocker for engaging the links in one direction of its rocking movement.

2. The combination with an endless chain conveyer of mechanism for engaging the successive links of said conveyer comprising a segment shaped rocker in constant engagement with said links, and a pawl pivotally mounted on said rocker for engaging the links in one direction of its rocking movement.

3. The combination with an endless chain conveyer comprising a conveyer drum having fixed bearings and a drum mounted on a bell-crank lever one arm of which is provided with a counterweight, an endless chain conveyer disposed around the said drum, and mechanism for engaging the successive links of said conveyer comprising a segment shaped rocker adjacent the movable drum and in constant engagement with said links, and a pawl pivotally mounted on said rocker for engaging the links when the rocker is subjected to movement in the direction of the movable drum.

In testimony whereof I have hereunto set my hand.

RANDAL E. TALLEY.