

Aug. 16, 1932.

E. G. DE CORIOLIS

1,871,501

CONVEYER FOR FURNACES

Original Filed May 16, 1931 2 Sheets-Sheet 1

Fig. 1

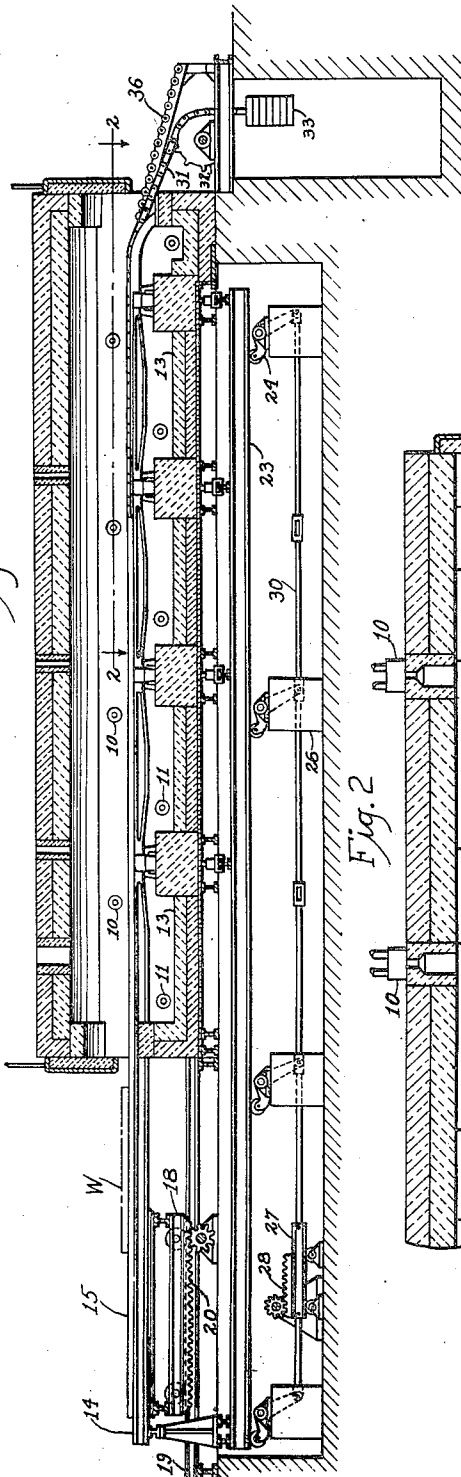


Fig. 2

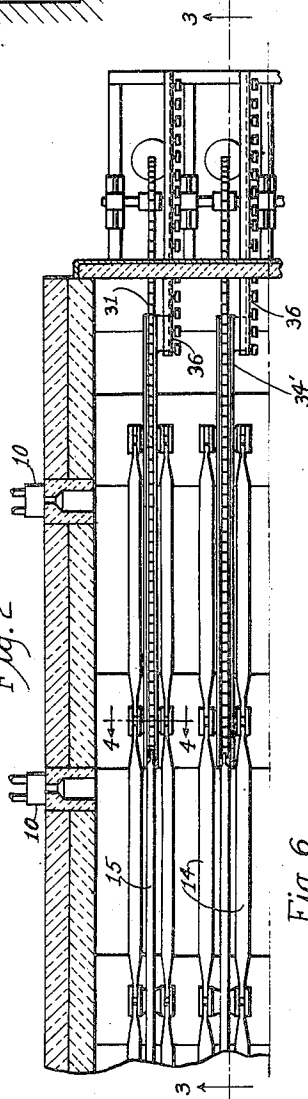
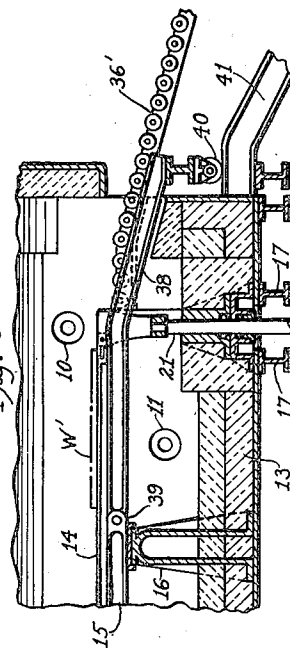


Fig. 6



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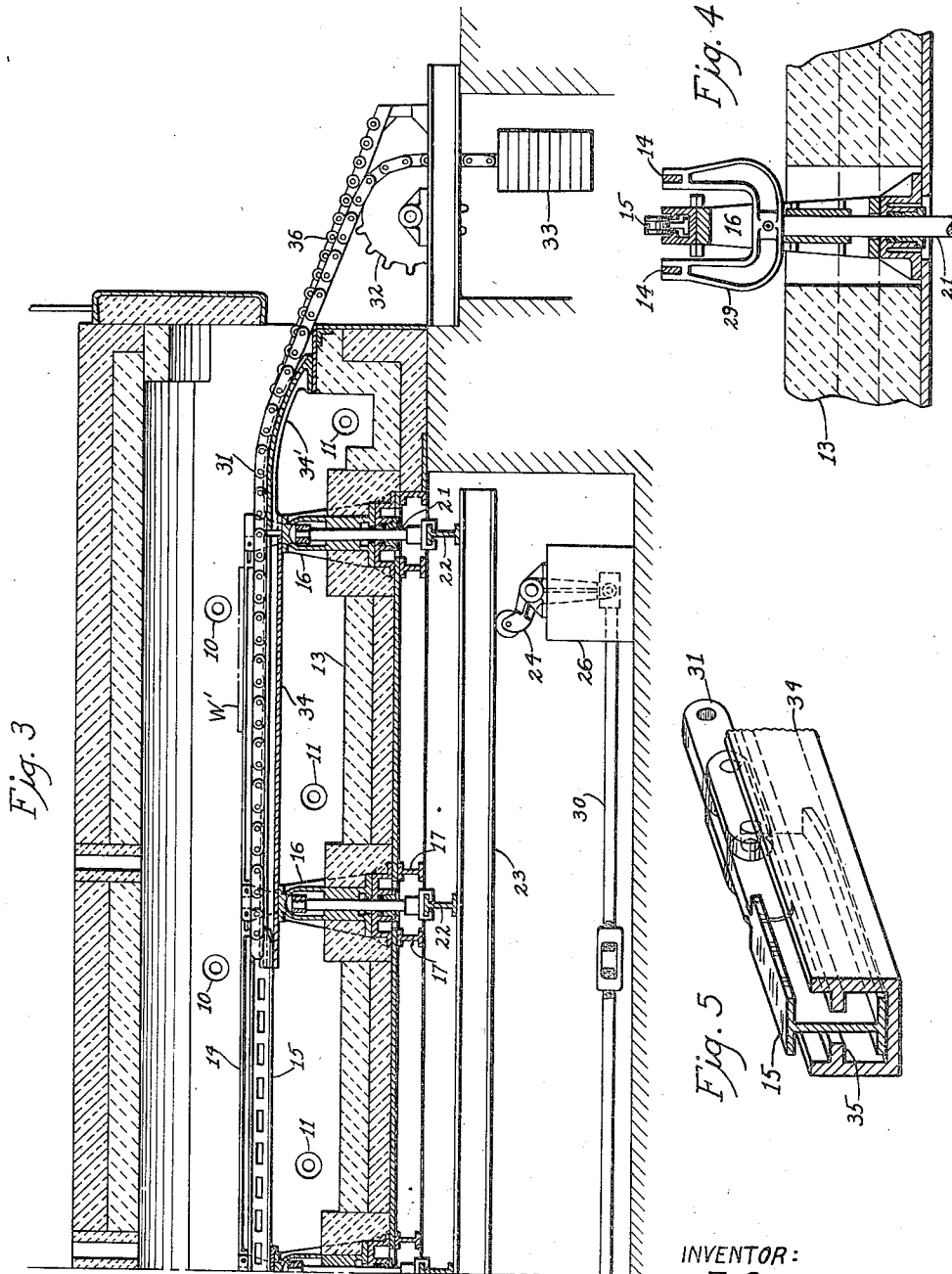
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CONVEYER FOR FURNACES

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This invention relates to improvements in conveyers for furnaces and more particularly to conveyers which transport the work through the furnace in a series of steps or hops; and has for its object to provide a simple and practical means for unloading the work from the conveyer for discharge from the furnace when the work has been transported by the conveyer to a point adjacent the discharge end of the furnace.

Referring to drawings wherein the preferred form of the invention is shown,—

Fig. 1 is a vertical longitudinal section through a furnace showing the invention embodied therewith;

Fig. 2 is a fragmentary sectional plan on line 2—2 of Fig. 1;

Fig. 3 is an enlarged vertical longitudinal section of the discharge end of the furnace shown in Fig. 1;

Fig. 4 is a fragmentary section on line 4—4 of Fig. 2;

Fig. 5 is a fragmentary perspective of a detail of mechanism shown in Fig. 3, and

Fig. 6 shows a modified form of discharging apparatus.

For the purpose of illustrating the application of the invention, there is shown a furnace fired by upper and lower tiers of burners 10 and 11, respectively; and a reciprocable conveyer which comprises two sets of work-supporting beds, one set being vertically but not horizontally movable and the other set being horizontally but not vertically movable. The vertically movable bed comprises a set of longitudinally extending rails 14 and the horizontally movable bed a set of longitudinally extending rails 15.

The horizontally or longitudinally movable rails 15 are slidably supported on fixed standards 16 as more clearly shown in Fig. 4, said standards preferably comprising a metal frame the base of which is securely anchored on cross beams 17 which extend below and assist in supporting the floor 13 of the furnace. At the charging end of the furnace, said rails 15 are secured to and supported on a reciprocating carriage 18 adapted to run on tracks 19, the carriage being re-

ciprocated by any suitable means as by a rack and pinion arrangement 20.

The vertically movable rails 14 are supported on vertically movable posts 21 which in turn are supported on cross beams 22 which in turn are supported on a longitudinally extending frame 23 which is supported on longitudinally alined bell cranks 24 supported on suitable base 26 and connected by longitudinally extending bars or links 30 which latter are connected to a reciprocating carriage 27 adapted to be reciprocated by any suitable means as a rack and pinion arrangement 28. As clearly shown in Fig. 4, the posts 21 are mounted in the frames 16 and at their upper ends are provided with individual U-shaped heads or yokes 29 between the arms of which the longitudinally movable rails 15 extend and to the tops of which the rails 14 are secured.

The operation of the conveying mechanism thus far described may be briefly described as follows: Assuming work W, such as sheets or bars, to have been deposited on the conveyer at the charging end of the furnace, and more particularly to have been deposited on the bed 15 immediately following the lowering of the bed 14, the bed 15 thereupon moves towards the right a predetermined distance and then stops whereupon the bed 14 rises and lifts the work from the bed 15 whereupon the bed 15 returns to its starting position whereupon the bed 14 is lowered thus redepositing the work on the bed 15 which again moves forward the same as before, the cycle being repeated as will now be readily understood. The length of stroke of the horizontally movable bed 15 may be adjusted as desired. Any suitable prime mover, not shown, may be utilized for operating the conveyer as a whole, it being understood that the movements of the beds are properly coordinated.

Coming now to the description of the discharging mechanism which constitutes the present invention, it will be noted that the rails 15 comprising the longitudinally reciprocable bed terminate within the furnace a substantial distance from the discharge end thereof. Secured to the rails 15 and forming in effect a flexible continuation thereof are

chains 31 which pass over individual idlers 32 in axial alignment outside of the furnace, the idlers being sufficiently below the level of the rails 15 to give a decided incline to the chains; and weights 33 being secured to the free ends of the chains to keep them taut at all times. For supporting the chains within the furnace, there is provided individual guide ways 34 supported on aligned standards 16. The guideway is made large enough to provide a downwardly extending portion 34¹ which is shown as resting on the door sill. Each guide way 34 is provided with inwardly and oppositely extending flanges 35 which together form a seat for the chain for the major portion of the length of said guide way. The terminal ends of the rails 15 are also supported by the guide way. It will therefore be appreciated that the chains will be moved in unison with the rails 15, each chain being in effect an articulated extension of the individual rails.

Associated with the downwardly inclined portions of the chains 31 is an unloading table shown as made up of a plurality of roller-provided members 36 all arranged in a common plane and extending from a point inside of the furnace to a point outside thereof above the idlers 32, the arrangement being such as will permit the work to be transferred from the chains to the table at the place where the chains begin the downward incline at the guide way portion 34¹. Remembering that the rails 15 reciprocate longitudinally as a unit and the rails 14 vertically, it will be readily appreciated that the work will eventually reach a position on the articulated extension of the rails 15 as indicated at W' in Fig. 3 and that on the next succeeding stroke of the rails 15 the work will be advanced sufficiently to be received on the unloading table 36, the transition of the work from the articulated extensions to said table being gradual until finally the work will be sufficiently clear of said extensions to move by gravity down the unloading table.

It will be noted that the chains 31 form, as it were, an angled extension of the conveyer 15 due to the fact that the chains extend downwardly and outwardly below the table 36. While I prefer that said extension shall consist of chains nevertheless, it is within the spirit of the invention to utilize rigid angled members 38 as shown in Fig. 6, said members being hinged to the conveyer 15 as indicated at 39 and their outer ends being provided with a roller which rides on a track 41 which extends downwardly at a steeper angle than the work-receiving table 36¹.

What is claimed as new is:

1. In a conveying apparatus for a heating furnace, a forwardly and downwardly inclined work-discharging table at the discharge end of the furnace, a longitudinally

reciprocable work-supporting bed extending into the furnace and terminating short of said table, means connected to said bed and forming therewith an angled extension which terminates at a point in advance of and below the upper end of said table, and vertically reciprocable means for periodically lifting the work from and redepositing it on said bed, said table being independent of said bed and said vertically reciprocable means.

2. In a conveying apparatus for a heating furnace, a forwardly and downwardly inclined work-discharging table at the discharge end of the furnace, a longitudinally reciprocable work-supporting bed extending into the furnace and terminating short of said table, a hinged extension of said bed, said extension having a straight away portion and a downwardly inclined portion of steeper angle than said table, and vertically reciprocable means for periodically lifting the work from and redepositing it on said bed.

3. In a conveying apparatus for a heating furnace, a forwardly and downwardly inclined work-discharging table at the discharge end of the furnace, a longitudinally reciprocable work-supporting bed extending into the furnace and terminating short of said table, a bed of chains connected to said bed and forming a continuation thereof to a point below the level of said table, and vertically reciprocable means for periodically lifting the work from and redepositing it on said bed.

4. In a conveying apparatus for a heating furnace, a longitudinally reciprocable work-supporting bed extending into the furnace and terminating short of the discharge end thereof, articulated means secured to and forming an extension of said bed through the discharge end of the furnace, means for maintaining said means under tension, said bed comprising a plurality of laterally spaced rails, and vertically reciprocable means for periodically lifting the work from and redepositing on said bed.

5. In a conveying apparatus for a heating furnace, a longitudinally reciprocable work-supporting bed extending into the furnace, articulated means extending into the furnace through the discharge end thereof and being coupled to the said bed and forming an extension thereof, a slide way on which said means is supported, means for maintaining said means under tension, and vertically reciprocable means for lifting the work from and redepositing on said bed.

6. The combination with a furnace and a reciprocable conveyer for transporting the work to be heated in a series of steps and a work-receiving table at the discharge end of the furnace, of means for transferring the work from the conveyer to said table, said means comprising longitudinally flexible

means extending upwardly and forwardly into the furnace from below said table and coupled to said conveyer for movement therewith.

5 7. In the combination specified in claim 6, said longitudinally flexible means comprising chains maintained in taut condition.

8. The combination with a furnace and a reciprocable conveyer for transporting the work to be heated in a series of steps and a work-receiving table at the discharge end of the furnace, of means for transferring the work from the conveyer to said table, said means comprising longitudinally flexible means extending upwardly and forwardly into the furnace from below said table and coupled to said conveyer for movement therewith, and means between said conveyer and table for supporting said flexible means in a manner to support load.

9. The combination with a furnace and a reciprocable conveyer for transporting the work to be heated in a series of steps and a work-receiving table at the discharge end of the furnace, of means for transferring the work from the conveyer to said table, said means comprising a plurality of laterally spaced chains extending upwardly and forwardly into the furnace from below said table and coupled to the conveyer for movement therewith, and means for maintaining the chains in taut condition.

10. The combination with a furnace and a reciprocable conveyer for transporting the work through the furnace in a series of steps, of a work-receiving table extending upwardly and forwardly into the furnace from a point adjacent the discharge end of the furnace, flexible means extending upwardly and forwardly into the furnace from below said table and coupled to said conveyer for movement therewith, said means adapted to receive work from the conveyer and transfer it to said table.

11. In apparatus for conveying work through a furnace in a series of hops or steps, the combination of a bed on which the work rests between conveying intervals, reciprocable means for moving the work longitudinally of said bed, a plurality of chains connected to said means for movement therewith and projecting from the furnace at the discharge end thereof, a transfer table whereonto the work is received from the chains after discharge from the furnace, and means outside of the furnace for maintaining the chains in taut condition.

12. The combination with a furnace and a reciprocable conveyer for transporting the work to be heated in a series of steps and a work-receiving table at the discharge end of the furnace, of an extension coupled to the conveyer for movement therewith, said extension being angled intermediate its end whereby to provide a downwardly and out-

wardly extending portion, said portion terminating below said table whereby work may be transferred from said extension to said table.

13. The combination with a furnace and a reciprocable conveyer for transporting the work to be heated in a series of steps and a work-receiving table at the discharge end of the furnace, of an extension coupled to the conveyer for movement therewith, said extension being angled intermediate its ends whereby to provide a downwardly and outwardly extending portion, said portion terminating below said table whereby work may be transferred from said extension to said table, said extension comprising a bed of chains.

14. The combination with a furnace and a reciprocable conveyer for transporting the work to be heated in a series of steps and a work-receiving table at the discharge end of the furnace, of an extension coupled to the conveyer for movement therewith, said extension being angled intermediate its ends whereby to provide a downwardly and outwardly extending portion, said portion terminating below said table whereby work may be transferred from said extensions to said table, said extension comprising a rigid member.

15. The combination with a reciprocating conveyer for moving work through a furnace, of longitudinally extending flexible means forming a continuation of the conveyer at the discharge end of the furnace, means for exerting longitudinal pull on said flexible means to maintain the same under tension, and means associated with the conveyer for reciprocating said flexible means.

16. The combination with a conveyer for moving work through a furnace, of longitudinally reciprocable flexible means at the discharge end of the conveyer for receiving the work therefrom, means for causing said means to take an inclined path of travel at a point in advance of said conveyer, and means for maintaining said flexible means under tension.

17. The combination with a reciprocating conveyer for moving work through a furnace, of a plurality of laterally-spaced chains forming a continuation of the conveyer at the discharge end of the furnace, means for exerting pull on said chains, means associated with the conveyer for reciprocating said chains, and means for causing said chains to take a downwardly inclined path of travel at a point in advance of said conveyer.

In testimony whereof I affix my signature.

ERNEST G. DE CORIOLIS.